UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

June 27, 2003

Larry Dawson
Forest Supervisor
Clearwater National Forest
12730 Highway 12
Orofino, Idaho 83544

RE: Endangered Species Act Section 7 Consultation: Final Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat Consultation for the 2003 Recreational Suction Dredging in Lolo Creek (18 projects)

Dear Mr. Dawson,

This document transmits the NOAA's National Marine Fisheries Service (NOAA Fisheries) biological opinion (Opinion) for recreational suction dredging in Lolo Creek. The Opinion is based on NOAA Fisheries' review of the proposed projects and their effects on Snake River steelhead (*Oncorhynchus mykiss*), in accordance with the Endangered Species Act (ESA), and the projects' effects on Essential Fish Habitat (EFH) for chinook and coho salmon, in accordance with the Magnuson-Stevens Act (MSA). Formal ESA consultation is conducted under the authority of section 7(a)(2) of the ESA and its implementing regulations, 50 CFR Part 402. EFH consultation is conducted under the authority of section 305 (b)(2) of the MSA and its implementing regulations, 50 CFR Part 600.

The Clearwater National Forest (CNF) determined in the August 6, 2002, biological assessment (BA) for the recreational suction dredging projects that the proposed actions were likely to adversely affect listed Snake River steelhead, and likely to adversely affect EFH for chinook and coho salmon. This Opinion is based on information in the BA provided by the CNF and on literature cited in the Opinion. The enclosed document includes analysis supporting NOAA Fisheries' section 7 determination, an incidental take statement, and EFH consultation for the proposed action.

Pursuant to ESA consultation, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of Snake River steelhead. Please note that this Opinion includes Reasonable and Prudent Measures to avoid or minimize take, and mandatory Terms and Conditions to implement those measures.

Pursuant to EFH consultation, NOAA Fisheries concludes that the proposed action may adversely affect EFH for chinook and coho salmon. Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH Conservation Recommendations for any Federal or state agency action that would adversely affect EFH. All conservation measures proposed by the CNF and those contained in the ESA sections of the Opinion are applicable, and thus incorporated, as Conservation Recommendations for EFH.

Please note that the MSA section 305(b) and 50 CFR 600.920(j) require the Federal agency to provide a written response to NOAA Fisheries after receiving EFH Conservation Recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate, or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a Conservation Recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

If you have any questions, please contact Mr. Bob Ries at (208) 882-6148 or Mr. Dale Brege at (208) 983-3859.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: J. Foss - FWS
J. Hansen - IDFG
R. Eichsteadt - NPT

Endangered Species Act Section 7 Consultation Biological Opinion
and
Magnuson-Stevens Act
Essential Fish Habitat Consultation

for

Recreational Suction Dredge Mining in Lolo Creek
Clearwater and Idaho Counties, Idaho

Agency: U.S. Forest Service, Clearwater National Forest

Consultation Conducted By: NOAA's National Marine Fisheries Service (NOAA Fisheries),
Northwest Region (NWR)

Date Issued: June 27, 2003

Issued By: for Michael R Crouse
D. Robert Lohn
Regional Administrator

Refer to: 2002/00632

TABLE OF CONTENTS

I. INTRODUCTION

The Clearwater National Forest (CNF) proposes to allow recreational suction dredge mining to extract gold from Lolo Creek. The CNF is proposing the action according to its authority under the Organic Act of 1897, Multiple-Use Sustained Yield Act of 1960, Clean Water Act of 1970, and National Forest Management Act of 1976. After the CNF has completed the NEPA (National Environmental Policy Act) process, individual recreational suction dredging permits will be issued to the miners by the Idaho Department of Water Resources (IDWR).

A. Background and Consultation History

The proposed recreational mining activities are similar to activities that occurred in Lolo Creek in 2001. In the past, the CNF has worked cooperatively with the dredge miners to select specific locations and operating procedures that allow the dredges to operate with minimal disturbance of fish habitat. There was no dredging in 2002. Field reviews of mining activities in Lolo Creek were attended by dredge operators, and representatives of the CNF, U.S. Fish and Wildlife Service (USFWS), NOAA's National Marine Fisheries Service (NOAA Fisheries), Nez Perce Tribe (NPT), and IDWR on June 12, 2001 (prior to dredging), and on August 30, 2001 (after dredging). The first field review was conducted to discuss how operations would occur, and what measures might be necessary to prevent or reduce potential unwanted effects. The second field review evaluated the effects of mining to determine if any changes were needed in the operating procedures to avoid unwanted effects in the future. The reviewers (including NOAA Fisheries and USFWS) observed that the dredge mining had little physical effect on the stream channel beyond the immediate areas where gravels were either dredged or deposited, and no additional operating procedures were recommended.

A draft 2001 mining season biological assessment (BA) was updated in 2002 to reflect the findings from the 2001 field reviews. The CNF submitted a letter dated July 11, 2002, and a BA for the proposed 2002 Lolo Creek recreational suction dredging. Shortly thereafter, the CNF informed NOAA Fisheries that no permits would be issued for suction dredge activities in Lolo Creek for 2002 (Pat Murphy, CNF, pers. comm.) On August 6, 2002, the CNF requested formal consultation from NOAA Fisheries for the 2003 mining season.

The Lolo Creek recreational suction dredging activities proposed by the CNF would likely affect tribal trust resources. Because the suction dredging activities are likely to affect tribal trust resources, NOAA Fisheries contacted the NPT pursuant to the Secretarial Order (June 5, 1997). Copies of the draft Opinion were electronically sent to the NPT legal counsel (Eichstaedt) on September 26, 2002, February 10, 2003, and March 10, 2003. NOAA Fisheries did not receive any official comments from the NPT as a result of these electronic correspondences. In addition, NOAA Fisheries (D. Brege and B. Ries) met with the NPT (B. Hills and H. McRoberts) on
April 1, 2003 at the NPT Fisheries Complex near their tribal headquarters in Lapwai, Idaho. Although the NPT did not express specific concerns about the NOAA Fisheries analysis of effects in the draft Opinion, the tribe did express their objection to dredge mining in Lolo Creek since the mining occurs in

the same drainage where they are trying to reestablish chinook salmon. Specific tribal comments at this meeting focused on the need for additional project monitoring. Subsequently, NOAA Fisheries contacted the Clearwater National Forest
(P. Murphy) and negotiated additional monitoring to be incorporated into this Biological Opinion (Opinion).

This Opinion is valid for the 2003 mining season, provided that the proposed actions are consistent with the details in the BA and the terms and conditions of this Opinion. The number of claims in the area is not expected to change, nor are the IDWR regulations pertaining to recreational suction dredging.

B. Description of the Proposed Action

Proposed actions are defined by NOAA Fisheries regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Because approval of the sites by the CNF would enable the State of Idaho to issue stream channel alteration permits to the operators, a Federal nexus exists for interagency consultation under the Endangered Species Act (ESA) section 7(a)(2) and MSA section 305(b)(2). The proposed action would occur at approximately 18 locations in the Lolo Creek watershed, which is occupied by listed Snake River steelhead, and designated as Essential Fish Habitat (EFH) for chinook and coho salmon.

The CNF received 18 recreational suction dredge proposals for 2002. A work window of
July 1 through August 15 was developed to avoid steelhead emergence (which in most years is completed by July 1) and adult chinook spawning (most of which occurs in late August). The action area for recreational suction dredging consists of the mainstem of Lolo Creek, from its confluence with Utah Creek (T35N, R6E, S32), upstream to Belle Creek (T36N, R6E, S24), plus one operation in Belle Creek. The action area encompasses all dredge mining sites (approx. 28,000 square feet), and the downstream extent of stream reaches that might be affected by sediment and/or turbidity created by the dredge operations (approx. 5500 linear feet). The specific locations of the claims are displayed on maps in the BA.

Proposed recreational suction dredging activities consist of operating suction dredges with nozzles ranging from 2.5 to 5 inches in diameter, and engines with 15 horsepower or less. Individual dredges would be operated from 7 to 46 days, in areas ranging in size from
24 to 3100 square feet (Table 1). Suction dredges would be used to excavate streambed materials down to bedrock, where heavier gold particles may be deposited. Excavated materials are sucked into the dredge nozzle, passed through a sluice box attached to the back of the dredge, and then redeposited in the stream. A suction dredge motor is generally operated for a short duration on a given day because the technique requires operators to sort through the materials that pass through the dredge, which is time consuming. Dredge sites are typically located in areas where the depth to bedrock is

relatively shallow (usually less than 6 feet), to minimize the amount of material that needs to be excavated before reaching gold-bearing deposits. The best areas for locating gold are generally not the best salmonid habitat. For example, miners prefer to dredge in the upstream end of pools, in seams and pockets of exposed bedrock, and sometimes on the inside of river bends where the current begins to slow and heavier materials accumulate.

Table 1. Description of Proposed Lolo Creek Recreational Suction Dredging. Values are estimates of excavation areas, based on the number of days miners plan to operate, estimated capacity of the suction dredges for a five hour workday, and the minimum days the Forest Service will monitor.

OPERATOR	NOZZLE SIZE	MAX. DAYS OPERATING	MAX. LENGTH OF DISTURBANCE	MAX. AREA OF DISTURBANCE	DAYS MONITORED
Aldernman, Alan	5"	46 days	518 ft.	3108 sq. ft.	23
Barteaux, Bill & Sheila	2.5 or 5"	46 days	518 ft.	3108 sq. ft.	23
Brown, Fred	2.5, 3, or 5"	14 days	158 ft.	948 sq. ft.	7
Bunch, Gordon	5"	7 days	79 ft.	474 sq. ft.	4
Cahala, James	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
Calkins, Daniel Calkins, Gary Crooks, Mike	5"	46 days	518 ft.	3108 sq. ft.	23
Dallman, Ted	sluice box	14 days	8 ft.	24 sq. ft.	7
GPAA (1)	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
GPAA (2)	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
GPAA (3)	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
Haley, Ken Happ, Robert	4"	15 days	113 ft.	678 sq. ft.	8
Hopkins, Elwood	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
Lengachers, Ron & Ellen	2.5 or 5"	30 days	338 ft.	2028 sq. ft.	15
Montgomery, Richard	2.5 or 5"	46 days	518 ft.	3108 sq. ft.	23
O’Conner, L.R.	2.5 or 5"	10 days	113 ft.	678 sq. ft.	5
Patterson, Jack & Cora Du Pont, Del	2.5 or 5"	46 days	518 ft.	3108 sq. ft.	23
Reynolds, Dennis & Marla	2.5 or 5"	46 days	518 ft.	3108 sq. ft.	23
West, Mike	4"	14 days	105 ft.	630 sq. ft.	7

II. ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with USFWS and NOAA Fisheries, as appropriate, to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their critical habitats, if designated. This Opinion is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations found at 50 CFR 402.

A. Biological Opinion

The objective of this Opinion is to determine if the 2003 Lolo Creek suction dredging is likely to jeopardize the continued existence of Snake River steelhead.

1. Biological Information and Critical Habitat

Suction dredging in Lolo Creek may affect ESA-listed Snake River steelhead. Snake River steelhead were listed as threatened on August 18, 1997 (62 FR 43937), and protective regulations were established on July 10, 2000 (65 FR 42422). The Snake River steelhead Evolutionary Significant Unit (ESU) includes all natural-origin populations of steelhead in the Snake River basin of Southeast Washington, Northeast Oregon, and Idaho. Critical habitat for Snake River steelhead was administratively withdrawn on April 30, 2002. The portion of Lolo Creek where suction dredging would occur provides spawning and rearing habitat for steelhead. Based on life history timing of this ESU, it is likely that juvenile steelhead, and possibly incubating eggs or alevins, would be affected by the proposed dredging activities. Snake River basin adult steelhead enter fresh water in the Columbia River from June to October. Two distinct groups of steelhead (A-run and B-run) occur in the Snake River basin, based on the timing of passage over Bonneville Dam (Busby et al.1996). A-run steelhead pass Bonneville Dam before August 25, and are widely distributed in the Snake River basin. A-run steelhead occupy lower portions of the Clearwater drainage, including the Middle Fork Clearwater and Lower South Fork Clearwater Rivers and tributaries (Kiefer et al.1992). B-run steelhead pass Bonneville Dam after August 25, and occur primarily in the Clearwater drainage, particularly in upper portions of the drainage, such as the Lochsa, Selway, and upper South Fork Clearwater Rivers (Kiefer et al. 1992). Lolo Creek supports both A and B-run steelhead. Steelhead usually spawn in March to early June. The eggs hatch in 4 to 7 weeks, with fry emerging from the gravel in mid-June to mid-August. The action area in the Lolo Creek drainage is at a moderate elevation (3000 feet to 4000 feet), where spawning and emergence are believed to occur near the early end of the range[1]. Steelhead juveniles generally rear in smaller streams for 2 years, but rearing can range from 1 to 4 years and occasionally up to 7 years, with some becoming resident (Busby et al.1996; Bennett 1999). Adult steelhead and smolt are unlikely to be present in Lolo Creek from July 1 to August 15, and habitat modifications would have little effect on those life stages.

a. Status of the Snake River Steelhead ESU

The Snake River steelhead ESU, listed as threatened on August 18, 1997 (62 FR 43937), includes all natural-origin populations of steelhead in the Snake River basin of southeast Washington, northeast Oregon, and Idaho. None of the hatchery stocks in the Snake River basin are listed, but several are included in the ESU.

Natural runs of Snake River steelhead have been declining in abundance over the past decades. For the Snake River steelhead ESU as a whole, the median population growth rate (lambda) from years 1980-1997, ranges from 0.699 to 0.978, depending on the assumed number of hatchery fish reproducing in the river (Table 2). Some of the significant factors in the declining populations are mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50% of their historic range, and degradation of habitat used for spawning and rearing. On the Clearwater River, the Harpster Dam blocked steelhead passage from 1910 - 1935, while the Lewiston Dam limited steelhead passage, but was not a complete migrational barrier. Habitat problems are common in the range of this ESU. Spawning and rearing habitats are impaired in places from factors such as tilling, water withdrawals, roads, timber harvest, grazing, mining, and alteration of floodplains and riparian vegetation. Mainstem Columbia River and Snake River hydroelectric developments have altered flow regimes and disrupted migration corridors. Possible genetic introgression from hatchery stocks is another threat to Snake River steelhead since wild fish comprise such a small proportion of the population.

[1]CNF snorkel surveys conducted sporadically during the 1990s identified steelhead fry between early and late July. This indicates that emergence occurred shortly beforehand. In some years surveys were not possible due to high flow conditions.

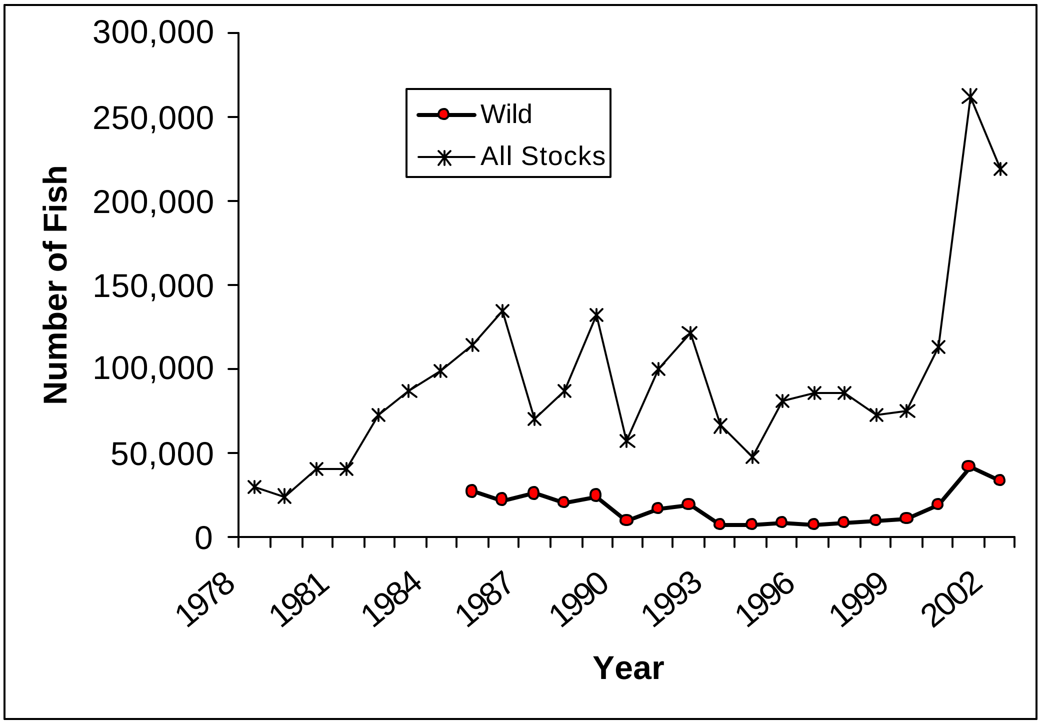
Table 2. Annual rate of population change (λ) in Snake River steelhead, absolute risk of extinction (1 fish/generation), and risk of 90% decline in 24 and 100 years for the period 1980-1994[†]. The range of reported values assumes that hatchery-origin fish either do not contribute to natural production or are as productive as natural-origin spawners.

Model Assumptions	λ	**Risk of extinction**		**Probability of 90% decrease in stock abundance**	
		24 years	100 years	24 years	100 years
No correction for hatchery fish	0.978	A Run 0.000 B Run 0.000	A Run 0.000 B Run 0.000	A Run 0.000 B Run 0.060 Aggregate 0.000	A Run 0.000 B Run 0.520 Aggregate 0.434
No instream hatchery reproduction	0.910	A Run 0.000 B Run 0.000	A Run 0.010 B Run 0.093	A Run 0.200 B Run 0.730 Aggregate 0.476	A Run 1.000 B Run 1.000 Aggregate 1.000
Instream hatchery reproduction = natural reproduction	0.699	A Run 0.000 B Run 0.000	A Run 1.000 B Run 1.000	A Run 1.000 B Run 1.000 Aggregate 1.000	A Run 1.000 B Run 1.000 Aggregate 1.000

[†] From Table B-2a and B-2b (NMFS 2000).

No estimates of historical (pre-1960s) Snake River steelhead abundance are available. In general, aggregate (combined counts of wild and hatchery-origin fish) steelhead abundance declined sharply in the early 1970s, rebuilt modestly from the mid-1970s through the 1980s, and declined again during the 1990s. Adult returns at Lower Granite Dam dramatically increased since 2000, however, the recent increase is due primarily to hatchery returns, with wild fish comprising only 15-18% of the adult returns since 2000 (Figure 1). The large returns in recent years are thought to be a result of cyclic ocean and climatic conditions favorable to anadromous fish, consequently, the large returns are not expected to continue. The long-term trend for wild Snake River steelhead is a gradual population decline, with periodic oscillations, such as the increase in adult returns in the last few years (Figure 1). The longest consistent indicator of steelhead abundance in the Snake River basin is derived from counts of natural-origin steelhead at Lower Granite dam on the lower Snake River. According to these estimates, the abundance of natural-origin summer steelhead at Lower Granite dam declined from a 4-year average of 58,300 in 1964 to a 4-year average of 8,300 ending in 1998. The most recent 4-year average of wild fish (1998-2002) is 26,358 adults. Parr densities in natural production areas have been substantially below estimated capacity (Hall-Griswold and Petrosky 1996). Downward trends of wild steelhead in the1990s, increased numbers of hatchery fish since 2000, and low parr densities indicate a particularly severe problem for B-run steelhead, whose loss would substantially reduce life history diversity of Snake River Basin steelhead.

Figure 5. Counts of wild and aggregate (wild and hatchery-origin) Snake River steelhead passing over Lower Granite Dam, 1978 -2002 (from NPPC 2003).



Stock status for Snake River steelhead is further discussed in Attachment A. Additional information on the status of Snake River steelhead is also described in a steelhead status review (Busby et al. 1996) and the draft Clearwater Subbasin Summary (CPAG 2002).

2. Evaluating the Proposed Action

The standards for determining jeopardy and adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402.02 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with The Habitat Approach (NMFS 1999): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status;
(3) determine the effects of the proposed or continuing action on the species; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild (or adversely modify its critical habitat, if critical habitat has been designated). In completing this step of the analysis, NOAA Fisheries

determines whether the action under consultation, together with all cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species (or result in the destruction or adverse modification of critical habitat, if critical habitat has been designated). If either or both are found, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Because a final Recovery Plan has not been developed for Snake River steelhead, NOAA Fisheries must ascribe the appropriate significance to actions to the extent available information allows. NOAA Fisheries intends that recovery planning identify areas/stocks that are most critical to species conservation and recovery from which proposed actions can be evaluated for consistency under section 7(a)(2).

a. Biological Requirements in the Action Area

The first step NOAA Fisheries uses when applying the ESA section 7(a)(2) to the listed ESUs considered in this Opinion is to define the species' biological requirements within the action area. NOAA Fisheries also considers the current status of the listed species, taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species within the action area, NOAA Fisheries starts with the determinations made in its decision to list for ESA protection the ESUs considered in this Opinion, and also considers any new data that is relevant to the determination.

Relevant biological requirements are those necessary for the listed ESUs to survive and recover to naturally reproducing population sizes, at which time protection under the ESA would become unnecessary. This will occur when populations are large enough to safeguard the genetic diversity of the listed ESUs, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The interim abundance target in the mainstem Clearwater River (which includes Lolo Creek) is 4900 spawners (NMFS 2002). For this consultation, the relevant biological requirements are those habitat elements that support successful adult and juvenile migration, adult holding, spawning, incubation, and rearing. The significant habitat elements include:
(1) channel substrate composition suitable for spawning, (2) water quality, (3) water quantity,
(4) water temperature, (5) water velocity, (6) cover/shelter, (7) food abundance and quality,
(8) riparian vegetation, (9) space, and (10) ability to move or migrate without artificial restrictions.

b. Environmental Baseline

The environmental baseline includes "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress" (50 CFR 402.02). In step 2 of NOAA Fisheries' evaluation of jeopardy/adverse modification of critical habitat, it evaluates the relevance of the environmental baseline in the action area to the species current status. In describing the environmental baseline, NOAA Fisheries emphasizes essential elements of designated critical habitat or habitat indicators for the listed salmonid ESUs affected by the proposed action. The action area is described in section I. B of this document. NOAA Fisheries does not expect other areas of the Lolo Creek watershed to be directly or indirectly affected by the proposed action.

In general, the environment for salmonids in the Columbia River Basin, including those that migrate past and downstream of the action area, has been dramatically affected by the development and operation of the Federal Columbia River Power System. Forestry, farming, grazing, road construction, hydrosystem development, mining, and urbanization have also greatly reduced the quantity and quality of historic habitat conditions in much of the basin. Environmental baseline conditions in the action area were evaluated in the BA at the project site and watershed scales, using the matrix of pathways and indicators (MPI) described by NMFS (1996b).

Changes in salmonid populations are also substantially affected by variation in the freshwater and marine environments. Ocean conditions are a key factor in the productivity of Northwest salmonid populations, and appear to have been in a low phase of the cycle for some time and are likely an important contributor to the decline of many stocks. The survival and recovery of these species will depend on their ability to persist through periods of low natural survival. Additional details about these effects can be found in the Federal Caucus (2000), NMFS (2000), and the Oregon Progress Board (2000).

Habitat conditions in Lolo Creek tributary watersheds vary from high to low quality, with highest quality generally on Federal lands with low road densities, and lowest quality on private lands at lower elevations where the lands are developed for numerous human uses. Stream conditions in Lolo Creek have been altered by farming, grazing, logging, and road building (USFS 1997). The CNF cited a stream and riparian survey of Browns Creek, a tributary of Musselshell Creek mostly on private lands, that showed the entire watershed had been either heavily grazed by cattle or logged intensively. Farming impacts occur on private lands in lower portions of the drainage, and logging, grazing, and roads are the dominant impacts in the upper portions of the drainage. Road densities range from 0.0 to 9.8 miles per square mile and average 4.8 miles per square mile on National Forest lands in the Lolo Creek drainage. Timber harvest and road building have led to a modeled seven percent increase in peak runoff in the Lolo Creek watershed (Jones 1999).

As stated within the BA, for the Lolo Creek drainage, the matrix indicators for water temperature, fish passage, road density, cobble embeddedness, large woody debris, and pool quality were rated as “not properly functioning,” and pool frequency, off-channel habitat, and habitat refugia were rated as “functioning at risk.” Fuller et al. (1984) report that problems in the lower reaches of Lolo Creek include annual stream flow variations, high summer stream temperatures, high levels of siltation, and the lack of instream cover. High sediment levels in the Lolo Creek drainage were attributed to roads, past timber harvest, and mining. Moderate to high levels of cobble embeddedness indicate reduced quality and quantity of summer and winter rearing habitat, and may be a limiting factor to fish production. Low levels of woody debris and sub-optimal levels of instream cover are limiting factors in a number of stream reaches (USFS 1997).

The BA for the proposed action stated that the Lolo Creek steelhead population is a combination of natural and hatchery-influenced fish, and it produces very few steelhead due to poor adult returns and degraded habitat conditions from historic stream channel alterations. Steelhead spawning occurs in the mainstem of Lolo Creek, from Musselshell Creek to Yoosa Creek, and also in tributaries in the upper Lolo Creek and Yoosa Creek drainages. Limited spawning may also occur in the Musselshell Creek and Eldorado Creek drainages, based on observations of juvenile steelhead in those areas. Juvenile steelhead rearing and spawning have also been documented in the upper mainstem of Lolo Creek, although the number of redds observed has been relatively low. Clearwater BioStudies, Inc. (1988) reported 88 steelhead redds in Lolo Creek during their July 1988 stream survey. The report noted that redds were found upstream of Musselshell Creek and downstream of Yoosa Creek. Most of these redds were associated with enhancement structures or side channels.

The biological requirements of listed Snake River steelhead are not met under the environmental baseline; however, fish habitat conditions in Lolo Creek have been improving in the past 20 years, as a result of restoration efforts that began in the late 1970s, and are continuing today. Improvements in environmental baseline conditions in the action area would have to continue in order to meet those biological requirements not presently met. Any further degradation or impairment in the improvement of these conditions might increase the amount of risk the listed ESUs presently face under the environmental baseline.

3. Analysis of the Effects of the Proposed Action

Effects of the action are defined as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR 402.02). Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing essential elements of critical habitat. Indirect effects are defined in 50 CFR 402.02 as “those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.” They include the effects on listed species or critical habitat of future activities that are induced by the proposed action and that occur after the action is completed. “Interrelated actions are those that are part of a larger action and depend on the larger action for their justification” (50 CFR 403.02). “Interdependent actions are those that have no independent utility apart from the action under consideration” (50 CFR 402.02).

a. Effects of Proposed Action

NOAA Fisheries jeopardy/adverse modification analysis approach evaluates the effects of proposed actions on listed salmon and steelhead in the context of the status of the species and their habitats. To avoid jeopardy, proposed actions generally must cause no more than minimal amounts of incidental take of the species, and also must restore, maintain, or at least not appreciably interfere with the recovery of the properly functioning condition (PFC) of the various fish habitat elements within a watershed.

The BA provides a detailed analysis of the effects of the proposed action on Snake River steelhead in the action area. The analysis is centered on application of NOAA Fisheries' MPI for the Lolo Creek drainage. In reviewing this information and accompanying narratives in the BA, NOAA Fisheries focuses particularly on the elements of the proposed action that have the potential to affect the fish or specific habitat components, such as spawning gravels, channel and stream bank stability, instream cover, and production of sediment and turbidity. The proposed recreational suction dredge mining activities are restricted by State permit conditions that limit potential effects of the activity. Potential effects are limited by restrictions imposed on nozzle and engine size, limitations of small-sized equipment, designation of potential dredging sites by the CNF to avoid sensitive areas, and CNF oversight and monitoring. Furthermore, recreational dredging is focused on limited areas (from 25 to 3100 square feet per site in the proposed action) that are not used for spawning[2]. When considered in the context of a stream with spawning areas spread over several miles, the amount of the habitat temporarily altered by the activity is small.

The proposed action includes operating procedures and precautionary measures that greatly reduce potential adverse effects and the likelihood of take, but neither adverse habitat effects, nor take can be discounted. Young-of-the-year steelhead are likely to be present in areas where dredging occurs, due to the proximity of spawning areas. The BA indicates that the majority of steelhead spawning in the mainstem of Lolo Creek occurs mainly between Musselshell and Yoosa Creeks, in the vicinity of mining claims. There is a chance that the action will result in take or eggs from disturbance of redds, or entrainment of fry. Take from disturbing a redd by a suction dredge is possible, but unlikely to occur since dredge locations would be 50 feet or more from spawning areas, and dredging would not begin until most steelhead have emerged from redds.

The work window is timed to begin after most steelhead emerge from the substrate, and cease before most chinook salmon spawn[3]. However, steelhead could emerge after July 1, particularly in late runoff years with cooler temperatures, when emergence could be delayed by up to 2 weeks (E. Schriever, Idaho Department of Fish and Game, pers. comm.). Based on the timing of spawning, stream temperatures in Lolo Creek, and the accumulated thermal units (ATUs) required for steelhead development, steelhead emergence from gravels in Lolo Creek would usually occur before July 1. ATUs's are a measure of cumulative heat, calculated as the sum of daily average water temperatures, in degrees Celsius, over a period of time. ATUs reported for steelhead emergence range from roughly

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[2] Spawning surveys were conducted annually by the CNF and the NPT between 1987 and 2002 for chinook salmon. Steelhead spawning surveys were conducted sporadically in the 1990s, conditions permitting.

[3] Most spawning activity occurs during late August.

550 (used a the Dworshak National Fish Hatchery) to 600 (Alaska Department of Fish and Game). Steelhead spawning occurs as temperatures reach a range of 3.9 to 9.4°C (Bell 1986). If spawning in Lolo Creek occurs no later than April 30, and the average stream temperature is 5°C (approximately 41°F) or higher during incubation, using the midpoint of reported ATUs required for emergence (575 ATUs), steelhead would emerge on July 5. With observed peak spawning around April 15, or slightly sooner (Johnson, BLM, pers. comm.), and average stream temperatures during incubation that are generally warmer than 5°C, most hatching and emergence should occur before July 1, the opening date of mining operations. With peak spawning around April 15, or slightly sooner (Johnson, BLM, pers. comm.), most hatching and emergence should occur before the July 1 opening mining operations date.

The proposed dredging activities are expected to have little impact on adult steelhead or the suitability of spawning gravels, since spawning occurs 5-6 months later during spring flows that naturally redistribute substrate. Movements of juvenile steelhead through the dredge areas could be delayed by several hours until instream activities cease, particularly on occasions when multiple dredges are operating nearby at the same time. Juvenile steelhead rearing in the vicinity of the suction dredging would likely be displaced while dredges are operating. However, juvenile steelhead could be attracted to the outfall from suction dredges if benthic invertebrates are dislodged and passed through the dredge. If this were to occur, the likelihood of entrainment is not likely to increase, since juveniles would congregate on the downstream side of the outfall, which is too far from suction nozzle for fish to become entrained.

The proposed dredging is expected to result in take of juvenile steelhead. Direct mortality of juvenile chinook salmon or steelhead could occur from entrainment of juveniles into the dredge. Griffith and Andrews (1981) observed high mortality of rainbow trout eggs and fry that were intentionally passed through a suction dredge, but juvenile and adult rainbow and brook trout all survived. Mortality of invertebrates was also low (< 1%). Although mortality could occur with fry or eggs, entrainment of eggs or fry is unlikely since the dredge season occurs after all or most of the eggs hatch, even in cooler years with later emergence. Additionally, dredges are generally operated in environments where the stream energy is too high for steelhead fry or fingerlings (which seek to conserve energy in slower water), and the substrate is too coarse for redds. The 50-foot operating distance from spawning areas reduces the likelihood of taking newly-emerged fry. Juveniles that have passed the fry stage are capable of maintaining a sufficient distance from the dredge nozzle suction such that they will not be entrained. In past experience with recreational suction dredging in Lolo Creek, there have been no reported incidents of juvenile steelhead or salmon being sucked into a dredge nozzle. Consequently, few, if any, listed fish are expected to be directly killed or injured by the dredge.

Suction dredging may affect salmonid food availability. Localized reductions in invertebrate populations were observed by Harvey et al. (1982) in comparisons of control and dredge areas; however, the differences did not occur at all locations. One year after dredging, Harvey et al. (1982) reported there was virtually no evidence that dredging had occurred at one study site, and substrate changes were eliminated at the other site. Somer and Hassler (1992) monitored density and composition of benthic invertebrates, and physical stream characteristics, above and below dredge sites in a northern California stream. They found qualitative differences in invertebrate species above and below the dredging, but no significant differences in numbers of invertebrates or diversity indices. Given the relatively small area where dredging would occur in the proposed action, it does not appear that food availability would appreciably change as a result of dredging.

Suction dredging may affect salmonid spawning areas by loosening fine particles that later might become deposited in redds, or by creating unstable gravel deposits that attract adult salmon to construct redds in areas that are more likely than natural substrate to wash out at high flows. Steelhead redds constructed in dredge spoils could be subjected to higher rates of scour than would occur naturally. Harvey and Lisle (1999) compared scour of chinook salmon redds before and after high winter flows in redds found in natural substrates and on dredge tailings. They found that chinook salmon redds located in tailings are subject to a higher rate of scouring than redds located in undisturbed areas. Steelhead redds could be affected similarly, however, steelhead redds located in dredge tailings would be less likely to scour since steelhead typically spawn after several high-flow events and scouring have occurred. Another mitigating factor is amount of area affected by dredging. The total surface area disturbed by the proposed mining is minute, in comparison to the available spawning areas in the vicinity of the dredge operations. The likelihood of spawning on dredge tailings may be inversely related to the availability of natural spawning gravels in the vicinity. Lolo Creek has ample spawning gravels in the area (although sedimentation is high), therefore, there is a low probability that steelhead would select dredge tailings for a redd site. In Lolo Creek, miners are required under the IDWR permit to avoid operating in natural spawning areas such as gravel bar areas at the tails of pools. These areas will be identified prior to dredging season by CNF personnel, and made known to the operators during the preseason field review. In addition, miners must disperse dredge tailings and refill holes so as to not create artificial spawning areas. In the study by Harvey and Lisle (1999), the greatest amount of scour occurred at a site where the dredge hole was around 2 feet below the mean surface elevation, and the spoils were piled around 2 feet above the mean surface elevation. The site with the least amount of scour had no discernable hole or pile left from the dredge operation. This observation indicates that refilling dredge holes might reduce the likelihood of scour. Given the small area disturbed by dredging and the requirement to fill the dredge holes, the likelihood that scour of steelhead redds would be induced by suction dredging is greatly reduced.

Increased turbidity was the other indicator in the matrix expected by the CNF to be affected by suction dredging. Turbidity and suspended sediment increases during suction dredge operations, but such increases are expected to be virtually undetectable 25 feet downstream, based on CNF observations of past dredge operations under the existing rules. Increased turbidity is expected to be brief (only while the dredge engine is operating). The Idaho Department of Environmental Quality (IDEQ) measured turbidity downstream of same-sized recreational dredges operating in a similar stream channel as the motor was running, and found that even when measured immediately behind the sluice outlet, turbidity never exceeded the state acute standard of
50 NTU (D. Stewart, IDEQ, pers. comm.). According to Waters (1995), brief low levels of elevated turbidity comparable to the IDEQ data is likely to have little or no measurable effect on primary production, invertebrates, or fish.

Sediment can become excessive if a suction dredge is operated in silt deposits. However, suction dredges are usually operated in areas with coarse particles, where high density, ore-bearing deposits are typically found. Consequently, particles typically suspended by suction dredges tend to settle rapidly, and sediment plumes typically do not extend much beyond the sluice outlet. Somer and Hassler (1992) observed increased deposition of sediment and organic material in sediment traps downstream from dredge activities 125 and 350 feet below dredge sites, 4-6 weeks after dredging occurred. Thomas (1985) found that suspended sediment concentration returned to background levels 35 feet downstream from the dredge, and Harvey et al. (1982) reported a similar finding; IDEQ observations were also comparable (D. Stewart, pers. comm.).

Harvey and Lisle (1998) reviewed literature on dredging effects and concluded that the effects of habitat alteration appear to be minor, localized, and brief. Excavation and deposition of dredge materials can result in localized changes in stream depth and size composition of surface materials, movement or redistribution of large particles or woody material, and destruction of streambanks. Subsurface cover in pools from protruding wood and boulders may be temporarily increased or decreased at a dredge site, depending on local circumstances. Changes in cover, however, typically persist only until the next high flow event fills dredge holes and redistributes dredge deposits. Somer and Hassler (1992) monitored dredge holes and sediment deposition from suction dredging and found that high flows redistributed bedload, filled dredge holes, and flushed sediment from the dredge sites. Based on similar observations of past suction dredging effects in the Clearwater River drainage, physical effects of recreational dredging are usually not discernable after the spring runoff, unless the streambank, large rocks, or logs are disturbed. Such disturbances are prohibited by conditions listed within the IDWR permits on CNF lands, and therefore, are not expected to occur.

The effect a proposed action has on particular essential habitat elements or pathways can be translated into a likely effect on population growth rate. In this consultation, a few individuals may be harmed or killed, but it is not possible to quantify an incremental change in survival for Snake River steelhead. Most likely, there will be no change in the population growth rate, at a watershed or ESU scale, since any harm or mortality that occurs is expected to affect a small number of juvenile individuals, at the point in their development where there is naturally a high rate of mortality. Based on the effects described above, the proposed action will have little effect on the abundance or productivity of Snake River steelhead.

b. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to impact fish and habitat within the action area. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being reviewed through separate ESA section 7 consultations. Past Federal actions have already been added to the environmental baseline in the action area.

The action area is mostly managed by the CNF, except for several square miles of the Lolo Creek drainage above the confluence with Jim Brown Creek, and non-Federal road systems in the vicinity. Consequently, potential cumulative effects are limited by the small portion of non-Federal lands. The primary use of non-Federal lands in the action area is cattle grazing and, secondarily, commercial timber production. Both uses have occurred on private and State lands in the drainage, and are expected to continue. Cattle grazing has deleterious effects on riparian vegetation and stream bank stability, and may contribute cumulatively to any sediment produced by habitat alterations from suction dredging. However, the additive effects of the proposed activity and future non-Federal activities are considered negligible since increases in sediment or
turbidity from the proposed activity is expected to be localized, of short duration, and separated by sufficient distance from future non-Federal activities so that the effects remain largely independent.

4. Conclusion

The final step in NOAA Fisheries' approach in determining jeopardy and/or adverse modification is to determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or adversely modify critical habitat. NOAA Fisheries has determined that, when the effects of the proposed action are added to the environmental baseline and cumulative effects occurring in the action area given the status of the stocks and condition of the habitat, the action is not likely to jeopardize the continued existence of Snake River steelhead. Further, NOAA Fisheries concludes that the subject action would not cause adverse modification or destruction of designated critical habitat because critical habitat is not designated for Snake River steelhead.

These conclusions are based on the following considerations:

1) The proposed action is not likely to retard the long-term progress of impaired habitat toward PFC for several reasons. They are: (a) the physical effects are short duration (less than 1 year until the next high flow) and involve a relatively small area (approx. 28,000 square feet or 1.5% of the streambed in the action area);   (b) sediment discharge from suction dredges typically travels less than 50 feet downstream; and (c) steelhead spawn at least 5-6 months after dredging.

2) The proposed action includes precautionary measures to avoid or minimize adverse effects on fish habitat. They are: (a) a 5 inch limit on nozzle diameter; (b) a 15 horsepower limit on engine size; (c) fueling is restricted to transfer of one gallon of fuel at a time; (d) operators are required to refill holes, and to avoid creation of spoils mounds; (e) operators are prohibited from undercutting or excavating stream banks, moving large rocks or logs present in the stream channel, operating a dredge in spawning gravels, creating turbidity that exceeds state standards, and sluicing materials

onto the stream bank; (f) a July 1 to August 15 work window that avoids most steelhead emergence and most chinook spawning; (g) all operating sites are approved and adequately marked on the ground by CNF personnel to ensure the sites are not located in spawning areas, and are in locations where channel stability would not be affected by dredging; (h) a pre-season field review will be conducted by dredge operators, and representatives of the CNF, IDWR, USFWS, and NOAA Fisheries to approve the sites, make any final adjustments in the location, prescribe site-specific mitigation measures, and explain how to recognize and avoid spawning areas; (i) dredge sites must be at least 50 feet from spawning gravels known or suspected to be used by either salmon or steelhead, based on spawning surveys by CNF personnel; and, (j) individual claims will be monitored buy the CNF during the operating season.

3) The proposed action will not appreciably reduce survival of Snake River steelhead since not more than a few individuals are likely to be harmed or killed. In reaching these determinations, NOAA Fisheries used the best scientific and commercial data available, including information provided in the suction dredging BA, and references cited in this Opinion.

5. Conservation Recommendations

Conservation recommendations are defined as suggestions of NOAA Fisheries "regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information" (50 CFR 402.02). Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The proposed action has incorporated all of NOAA Fisheries' recommendations that were suggested to the CNF, prior to formal consultation. Therefore, NOAA Fisheries has no additional conservation recommendations regarding the actions addressed in this Opinion.

6. Reinitiation of Consultation

This concludes formal consultation under the ESA on the Lolo Creek suction dredging as outlined in the BA. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

B. Incidental Take Statement

Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption.

Harm is further defined in 50 CFR. 222.102 as "an act that may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering." Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of the listed species. NOAA Fisheries is reasonably certain the incidental take described here will occur because: (1) recent surveys indicate the listed species are known to occur in the action area; and (2) the proposed action may harm or kill eggs or fry through entrainment by the suction dredge. Despite the use of best scientific and commercial data available, NOAA Fisheries cannot quantify a specific amount of incidental take of individual fish or incubating eggs for this action. Instead, the amount of take is anticipated to be no more than one incident per operator (18 operators on 13 claims), where one or more eggs, fry, or juvenile steelhead are entrained by the suction dredge.

2. Reasonable and Prudent Measures

Reasonable and Prudent Measures are non-discretionary measures to minimize take, that are not already part of the description of the proposed action. They must be implemented as binding conditions for the exemption in section 7(a)(2) to apply. The action agency has the continuing duty to regulate the activities covered in this incidental take statement. If the CNF fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and

conditions, the protective coverage of section 7(o)(2) may lapse. NOAA Fisheries believes that activities carried out in a manner consistent with these
reasonable and prudent measures, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant reasonable and prudent measures will require further consultation.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of take of listed fish resulting from implementation of the action. These reasonable and prudent measures would also minimize adverse effects on designated salmonid habitat.

1. The CNF shall minimize the amount and extent of incidental take from entrainment of eggs, fry, or juveniles.

2. The CNF shall minimize the amount and extent of incidental take from fuel spills.

3. The CNF shall minimize the amount and extent of incidental take from habitat alteration.

4. The CNF shall monitor to verify the activities are consistent with the effects analysis of the BA.

5. The CNF shall evaluate whether the scope and effects determination for proposed 2003 suction dredge operations are consistent with the BA.

3. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the CNF must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity. These terms and conditions are non-discretionary.

1. To minimize the likelihood of incidental take resulting from entrainment of eggs, fry, or juveniles (reasonable and prudent measure #1), the CNF shall:

   a. Require operators to conduct all suction dredge activities below the ordinary high water line between July 1 and August 15.

   b. Require operators to disperse all dredge piles and back-fill all dredge holes by the end of the operating season (August 15).

   c. Require operators to immediately cease operations if eggs are excavated or if dead or injured steelhead are observed, and contact the CNF. The CNF shall contact NOAA Fisheries before resuming activities.

2. To minimize the likelihood of incidental take and impact resulting from fuels (reasonable and prudent measure #2), the CNF shall:

   a. Require operators to anchor the suction dredge to the stream bank when refueling in the water (so that fuel does not need to be carried out into the stream); transfer no more than 1 gallon of fuel at a time (unless the dredge has a detachable fuel tank); and place absorbent material, such as a towel, under the fuel tank while refueling, to catch any spillage.

3. To minimize the likelihood of incidental take and impacts resulting from habitat disturbance (reasonable and prudent measure #3), the CNF shall:

   a. Require operators to not undercut banks or widen the channel.

   b. Require operators to not undermine, excavate, or remove any woody debris or rocks that extend from the bank into the channel.

   c. At the end of the season, revegetate camping areas, paths, and other disturbed sites located along streambanks associated with dredge operations.

4. To monitor the implementation of the proposed action (reasonable and prudent measure #4), the CNF shall:

   a. Visit each recreational dredge site at least five times between July 1 and August 15, or more often if problems occur, to monitor dredge activity and effects of the mining on fish habitat.

   b. Provide NOAA Fisheries an annual monitoring report describing operator compliance with suction dredging rules, the amount of stream area mined at each site, a photo of the mined area, and details about streambank vegetation disturbance and revegetation (if any). Submit the annual monitoring report by November 30, 2003, to:
   NOAA Fisheries, 102 N. College, Grangeville, Idaho 83530.

   c. Before the dredge mining window opens, obtain from the suction dredge operators a plan of operation that specifies the location, approximate amount of surface area they plan to dredge, and likely dates of operation. The operating plan would be used to establish channel monitoring sites, and is not intended to constrain the timing and location of dredge operation.

   d. Monitor potential changes in channel morphology as a result of mining, through the following activities at the mining site, and in the pool/riffle sequences immediately upstream and downstream from the mined area, before and after mining: (1) Wolman pebble counts; (2) channel cross-sections; (3) one longitudinal profile; and (4) pictures showing the location of gross features such as large woody debris, boulders, bank condition. At a minimum, sampling sites shall include one control site not affected by dredging, and sites representing the range of disturbance, such as one “small” area, one “medium” area, and one “large” area of disturbance.

e. At the end of the season, obtain from the suction dredge operators a description of the actual location(s), surface areas dredged, and number of days of operation.

f. Provide NOAA Fisheries an update of pre-season monitoring progress no later than June 15, and for post-season monitoring progress, no later than September 15.

5. To determine whether the scope and effects determination for proposed 2003 suction dredge operations are consistent with the BA (reasonable and prudent measure #5), the CNF shall:

    a. Review all applications for suction dredging in Lolo Creek for 2003 prior to issuing any permits. Determine that the extent and effects of the proposed action will be consistent with the BA.
    b. If the CNF determines the extent and effects of the action are not consistent with the BA, the CNF must reinitiate consultation immediately.

If a dead, injured, or sick steeelhead is found, operation must cease, and immediate notification must be made to the NOAA Fisheries Law Enforcement Office, in the Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; or call: (360) 418-4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care. Dead specimens should be handled to preserve biological material and integrity in the best possible state for later analysis of cause of death. With the care of sick or injured listed species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by NOAA Fisheries Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.

As soon as possible after observing any dead, injured, or sick steelhead, regardless of the life history stage, the CNF will also notify NOAA Fisheries at the Grangeville Field Office, at (208) 983-3859.

All terms and conditions shall be included in any permit, grant, or contract issued for the implementation of the action described in this Opinion.

III. MAGNUSON-STEVENS FISHERY CONSERVATION and MANAGEMENT ACT

A. Background

The objective of the Essential Fish Habitat (EFH) consultation is to determine if the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

B. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and “spawning, breeding, feeding, or growth to maturity” covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;
- NOAA Fisheries shall provide conservation recommendations for any Federal or State activity that may adversely affect EFH;
- Federal agencies shall, within 30 days after receiving conservation recommendations from NOAA Fisheries, provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

C. Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for Federally-managed fisheries within the waters of Washington, Oregon, and California. The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years; PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception to the Canadian border.

Detailed descriptions and identifications of EFH for the groundfish species are found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to The Pacific Coast Groundfish Management Plan (PFMC 1998a) and the NOAA Fisheries Essential Fish Habitat for West Coast Groundfish Appendix (Casillas *et al*. 1998). Detailed descriptions and identifications of EFH for the coastal pelagic species are found in Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (PFMC 1998b). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

D. Proposed Actions

The proposed actions are described above (see *Proposed Actions*, section I. B).

E. Effects of Proposed Action

As described in detail above (see *Evaluating the Proposed Actions*, section II. A.2), the proposed activities may result in detrimental short- and long-term adverse effects to a variety of habitat parameters. The CNF determined that the proposed suction dredge mining is likely to adversely affect EFH for chinook and coho salmon, due to localized, short-term alterations of stream channels, short-term increases in sedimentation and turbidity, and from disruptions by the operators. The CNF and State of Idaho developed mitigation measures to minimize short-term adverse effects, but the mitigation could not eliminate potential adverse effects.

F. Conclusion

Based on the analysis in *Evaluating the Proposed Actions*, section II. A.2, NOAA Fisheries believes that the proposed action may adversely affect EFH for chinook and coho salmon, but adverse effects (mostly from sediment) would be localized and temporary. The proposed action includes measures to avoid, minimize, or offset adverse effects to EFH. The effects of recreational suction dredging will vary, depending on local channel morphology. Most suction dredge sites will have a temporary change in water depth where dredge materials are excavated or deposited, but the stream bottoms are expected to return to a natural configuration after seasonal floods occur. Spawning would not be disturbed by dredging; however, salmon could be attracted to spawn in unstable dredge deposits that would likely wash out in a flood. The
likelihood of salmon spawning in dredge deposits has been minimized by locating the dredge sites in stream reaches where the water depth and velocity would be unlikely to attract spawning, and by requiring the CNF to ensure that operators disperse their dredge piles.

G. EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the CNF, all *Conservation Recommendations* outlined above in section II.A.5 and all of the *Reasonable and Prudent Measures* and the *Terms and Conditions* contained in sections II.B.2 and II.B.3, respectively, are applicable to EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

H. Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate, or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

I. Consultation Renewal

The CNF must reinitiate EFH consultation with NOAA Fisheries if the action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920 [k]).

IV. REFERENCES

Bell, M.C. 1986. Fisheries handbook of engineering requirements and biological criteria. Fish Passage Development and Evaluation Program, Corps of Engineers, North Pacific Division, Portland, Oregon.

Bennett, D. 1999. Fish Ecology 314 lecture supplement. University of Idaho, College of Natural Resources, Department of Fisheries, Moscow, Idaho.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NOAA Fisheries-NWFSC-27. August.

Casillas, E., L. Crocket, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmidt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson and T. Pepperell. 1998. Essential Fish Habitat West Coast Groundfish Appendix. National Marine Fisheries Service. Seattle, Washington. 778 p.

Clearwater BioStudies, Inc. 1988. Fish Habitat Characteristics and Salmonid Abundance in the Lolo Creek Study Area during Summer 1988. Final report to USDA Forest Service.

Clearwater Policy Advisory Group(CPAG). 2002. Draft Clearwater Subasin Assessment, September 2002. Submitted for review to the Northwest Power Planning Council, Portland, Oregon

Federal Caucus. 2000. Conservation of Columbia basin fish: Final basinwide salmon recovery strategy. <http://www.salmonrecovery.gov> December.

Fuller, R. K.; Johnson, J. H. and Bear, M. A. 1984. A Biological and Physical Inventory of the Streams Within the Lower Clearwater River Basin, Idaho. Lapwai, ID: Nez Perce Tribe.

Griffith, J. S., and D. A. Andrews 1981. Effects of small suction dredge on fishes and aquatic invertebrates in Idaho streams. North American Journal of Fisheries Management 1:21-28.

Hall-Griswold, J. A., and C. E. Petrosky. 1996. Idaho habitat/natural production monitoring: part I - annual report, 1995. Report IDFG 97-4, Idaho Department of Fish and Game, Boise, Idaho.

Harvey, B. C. and T. E. Lisle. 1998. Effects of suction dredging on streams: a review and evaluation strategy. Fisheries 23(8):8-17.

Harvey, B. C. and T. E. Lisle. 1999. Scour of chinook salmon redds on suction dredge tailings. North American Journal of Fisheries Management 19:613-617.

Harvey, B. C., K. McCleneghan, J. D. Linn, and C. L. Langley. 1982. Some physical and biological effects of suction dredge mining. Laboratory Report No. 82-3, California Department of Fish and Game, Environmental Services Branch, Fish and Wildlife Water Pollution Control Laboratory, Rancho Cordova, California.

Jones, R. M. 1999. Hydrology and water quality report for the Lochsa River subbasin analysis. Clearwater National Forest, Orofino, Idaho.

Keifer, S., M. Rowe, and K. Hatch. 1992. Stock Summary Reports for Columbia River Anadromous Salmonids, Volume V: Idaho Final Draft for The Coordinated Information System. Idaho Department of Fish and Game, Boise, Idaho.

National Marine Fisheries Service (NMFS). 1996b. Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale. NOAA Fisheries, Environmental and Technical Services Division, Habitat Conservation Branch, 525 NE Oregon Street, Portland, Oregon.

NMFS. 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for Action Affecting the Habitat of Pacific Anadromous Salmonids. NOAA Fisheries, Northwest Region, Habitat ConservationDivision, Portland, Oregon. Available online at: <http://www.nwr.noaa.gov/1habcon/habweb/pubs/newjeop9.pdf

NMFS. 2000. Biological Opinion -- Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. Hydro Program, Portland, Oregon.

NMFS. 2002. Interim Abundance and productivity targets for Interior Columbia salmon and steelhead listed under the Endangered Species Act. April 4, 2002, letter to the Northwest Power Planning Council, National Marine Fisheries Service, Seattle Washington.

Northwest Power Planning Council. 2003. Online data query for adult fish passage records at Lower Granite Dam. Fish Passage Center: http://www.fpc.org/ adult_history/ytd-lgr.htm

Oregon Progress Board. 2000. Oregon State of the Environment Report 2000. Oregon Progress Board, Salem, Oregon.

Pacific Fisheries Management Council (PFMC) 1998a. Amendment 8 to coastal pelagic species fishery management plan. Pacific Fishery Management Council, Portland, Oregon. December.

PFMC. 1998b. Final environmental assessment: regulatory review for Amendment 11 to Pacific Coast groundfish fishery management plan. PFMC, Portland, Oregon.

PFMC. 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council, Portland, Oregon.

Somer, W. L., and T. J. Hassler. 1992. Effects of suction-dredge gold mining on benthic invertebrates in a Northern California stream. North American Journal of Fisheries Management 12:244-252.

Thomas, V. G. 1985. Experimentally determined impacts of a small, suction gold dredge on a Montana stream. North American Journal of Fisheries Management 5:480-488.

U.S. Forest Service (USFS). 1997. Clearwater subbasin ecosystem analysis at the watershed scale. U.S. Department of Agriculture, U. S. Forest Service, Clearwater National Forest, Orofino, Idaho.

USFS. 1999. Clearwater National Forest monitoring and evaluation report, fiscal year 1998. Clearwater National Forest, Orofino, Idaho.

Waters, T. F. (ed.). 1995. Sediment in Streams: Sources, Biological Effects, and Control. American Fisheries Society Monograph 7. Bethesda, Maryland.

ATTACHMENT A

BIOLOGICAL REQUIREMENTS, CURRENT STATUS, AND TRENDS:

SNAKE RIVER STEELHEAD

A. General Life History

Steelhead can be divided into two basic run-types based on the state of sexual maturity at the time of river entry and the duration of the spawning migration (Burgner et al. 1992). The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in freshwater to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns shortly after river entry (Barnhart 1986). Variations in migration timing exist between populations. Some river basins have both summer and winter steelhead, while others only have one run-type.

In the Pacific Northwest, summer steelhead enter fresh water between May and October (Busby et al. 1996; Nickelson et al. 1992). During summer and fall, prior to spawning, they hold in cool, deep pools (Nickelson et al. 1992). They migrate inland toward spawning areas, overwinter in the larger rivers, resume migration in early spring to natal streams, and then spawn (Meehan and Bjornn 1991; Nickelson et al. 1992). Winter steelhead enter fresh water between November and April (Busby et al. 1996; Nickelson et al. 1992), migrate to spawning areas, and then spawn in late winter or spring. Some adults, however, do not enter coastal streams until spring, just before spawning (Meehan and Bjornn 1991). Difficult field conditions (snowmelt and high stream flows) and the remoteness of spawning grounds contribute to the relative lack of specific information on steelhead spawning.

Steelhead are iteroparous, or capable of spawning more than once before death. However, it is rare for steelhead to spawn more than twice before dying and most that do so are females (Nickelson et al. 1992). Iteroparity is more common among southern steelhead populations than northern populations (Busby et al. 1996). Multiple spawnings for steelhead range from 3% to 20% of runs in Oregon coastal streams.

Steelhead spawn in cool, clear streams containing suitable gravel size, depth, and current velocity. Intermittent streams may also be used for spawning (Barnhart 1986; Everest 1973). Steelhead enter streams and arrive at spawning grounds weeks or even months before they spawn and are vulnerable to disturbance and predation. Cover, in the form of overhanging vegetation, undercut banks, submerged vegetation, submerged objects such as logs and rocks, floating debris, deep water, turbulence, and turbidity (Giger 1973) are required to reduce disturbance and predation of spawning steelhead. Summer steelhead usually spawn further upstream than winter steelhead (Withler 1966; Behnke 1992).

Depending on water temperature, steelhead eggs may incubate for 1.5 to 4 months (August 9, 1996, 61 FR 41542) before hatching. Summer rearing takes place primarily in the faster parts of pools, although young-of-the-year are abundant in glides and riffles. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Productive teelhead habitat is characterized by complexity, primarily in the form of large and small wood. Some older juveniles move downstream to rear in larger tributaries and mainstem rivers (Nickelson et al. 1992).

Juveniles rear in fresh water from 1 to 4 years, then migrate to the ocean as smolts. Winter steelhead populations generally smolt after 2 years in fresh water (Busby et al. 1996). Steelhead typically reside in marine waters for 2 or 3 years prior to returning to their natal stream to spawn at 4 or 5 years of age. Populations in Oregon and California have higher frequencies of age-1-ocean steelhead than populations to the north, but age-2-ocean steelhead generally remain dominant (Busby et al. 1996). Age structure appears to be similar to other west coast steelhead, dominated by 4-year-old spawners (Busby et al. 1996).

Based on purse seine catches, juvenile steelhead tend to migrate directly offshore during their first summer rather than migrating along the coastal belt as do salmon. During fall and winter, juveniles move southward and eastward (Hartt and Dell 1986).

B. Population Dynamics and Distribution

The following section provides specific information on the distribution and population structure (size, variability, and trends of the stocks or populations) of the Snake River ESU. Most of this information comes from observations made in terminal, freshwater areas, which may be distinct from the action area. This focus is appropriate because the species status and distribution can only be measured at this level of detail as adults return to spawn.

The longest consistent indicator of steelhead abundance in the Snake River Basin is based on counts of natural-origin steelhead at the uppermost dam on the lower Snake River (Lower Granite Dam). The abundance of natural-origin summer steelhead at the uppermost dam on the Snake River has declined from a 4-year average of 58,300 in 1964 to an average of 8,300 ending in 1998. In general, steelhead abundance declined sharply in the early 1970s, rebuilt modestly from the mid-1970s through the 1980s, and again declined during the 1990s (Figure 1).

These broad scale trends in the abundance of steelhead were reviewed through the Plan for analyzing and testing hypotheses (PATH) process. The PATH report concluded that the initial, substantial decline coincided with the declining trend in downstream passage survival. However, the more recent decline in abundance, observed over the last decade or more, does not coincide with declining passage survival, but can be at least partially accounted for by a shift in climatic regimes that has affected ocean survival (Marmorek and Peters 1998).

B-run steelhead are distinguished from the A-run component by their unique life history characteristics. B-run steelhead were traditionally distinguished as larger and older, later-timed fish that return primarily to the South Fork Salmon, Middle Fork Salmon, Selway, and Lochsa rivers. The recent All Species Review by the Technical Advisory Committee (TAC) concluded that different populations of steelhead do have different size structures, with populations dominated by larger fish (i.e., greater than 77.5 cm) occurring in the traditionally defined B-run basins (TAC 1999). Larger fish occur in other populations throughout the basin, but at much lower rates (evidence suggests that fish returning to the Middle Fork Salmon and Little Salmon are intermediate in that they have a more equal distribution of large and small fish).

B-run steelhead are also generally older. A-run steelhead are predominately age-1-ocean fish, whereas most B-run steelhead generally spend two or more years in the ocean prior to spawning. The differences in ocean age are primarily responsible for the differences in the size of A- and B-run steelhead. However, B-run steelhead are also thought to be larger at the same age than A-run fish. This may be due, in part, to the fact that B-run steelhead leave the ocean later in the year than A-run steelhead and thus have an extra month or more of ocean residence at a time when growth rates are thought to be greatest.

Historically, a distinctly bimodal pattern of freshwater entry could be used to distinguish A-run and B-run fish. A-run steelhead were presumed to cross Bonneville Dam from June to late August whereas B-run steelhead enter from late August to October. The TAC reviewed the available information on timing and confirmed that the majority of large fish do still have a later timing at Bonneville; 70% of the larger fish crossed the dam after August 26, the traditional cutoff date for separating A- and B-run fish (TAC 1999). However, the timing of the early part of the A-run has shifted somewhat later, thereby reducing the timing separation that was so apparent in the 1960s and 1970s. The timing of the larger, natural-origin B-run fish has not changed.

The abundance of A-run versus B-run components of Snake River Basin steelhead can be distinguished in data collected since 1985. Both components have declined through the 1990s, but the decline of B-run steelhead has been more significant. The 4-year average counts at Lower Granite Dam declined from 18,700 to 7,400 beginning in 1985 for A-run steelhead and from 5,100 to 900 for B-run steelhead. Counts over the last 5 or 6 years have been stable for A-run steelhead and without significant trend (Figure 2). Counts for B-run steelhead have been low and highly variable, but also without apparent trend (Figure 3).

Comparison of recent dam counts with escapement objectives provides perspective regarding the status of the ESU. The management objective for Snake River steelhead stated in the Columbia River Fisheries Management Plan was to return 30,000 natural/wild steelhead to Lower Granite Dam. The

All Species Review (TAC 1997) further clarified that this objective was subdivided into 20,000 A-run and 10,000 B-run steelhead. Idaho has reevaluated these escapement

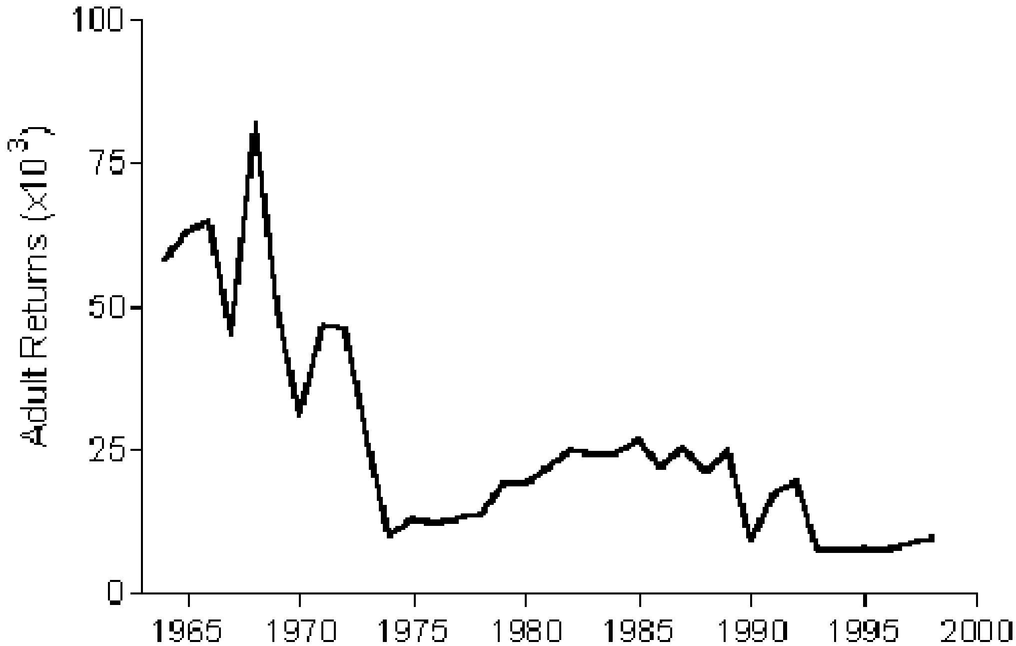
objectives using estimates of juvenile production capacity. This alternative methodology lead to revised estimates of 22,000 for A-run and 31,400 for B-run steelhead (pers. comm., S. Keifer, Idaho Department of Fish and Game with P. Dygert, NOAA National Marine Fisheries Service).

The State of Idaho has conducted redd count surveys in all of the major subbasins since 1990. Although the surveys are not intended to quantify adult escapement, they can be used as indicators of relative trends. The sum of redd counts in natural-origin B-run production subbasins declined from 467 in 1990 to 59 in 1998 (Figure 4). The declines are evident in all four of the primary B-run production areas. Index counts in the natural-origin A-run production areas have not been conducted with enough consistency to permit similar characterization.

Idaho has also conducted surveys for juvenile abundance in index areas throughout the Snake River Basin since 1985. Parr densities of A-run steelhead have declined from an average of about 75% of carrying capacity in 1985 to an average of about 35% in recent years through 1995 (Figure 5). Further declines were observed in 1996 and 1997. Parr densities of B-run steelhead have been low, but relatively stable since 1985, averaging 10% to 15% of carrying capacity through 1995. Parr densities in B-run tributaries declined further in 1996 and 1997 to 11% and 8%, respectively.

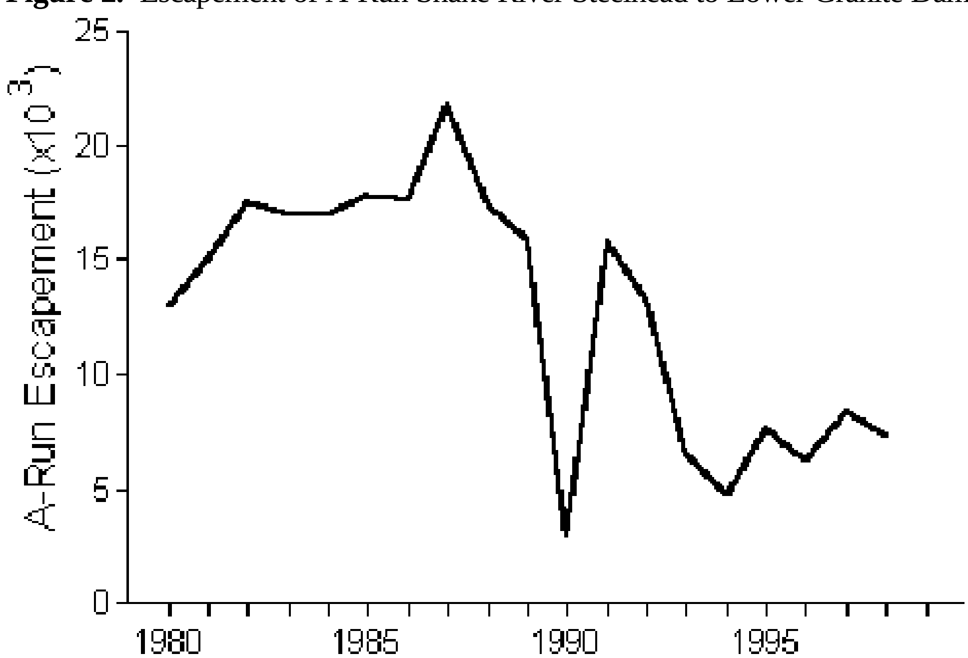
It is apparent from the available data that B-run steelhead are much more depressed than the A-run component. In evaluating the status of the Snake River Basin steelhead ESU, it is pertinent to consider if B-run steelhead represent a "significant portion" of the ESU. This is particularly relevant because the Tribes have proposed to manage the Snake River Basin steelhead ESU as a whole without distinguishing between components, and further, that it is inconsistent with NOAA’s National Marine Fisheries Service (NOAA Fisheries) authority to manage for components of an ESU.

Figure 1. Adult Returns of Wild Summer Steelhead to Lower Granite Dam on the Snake River.



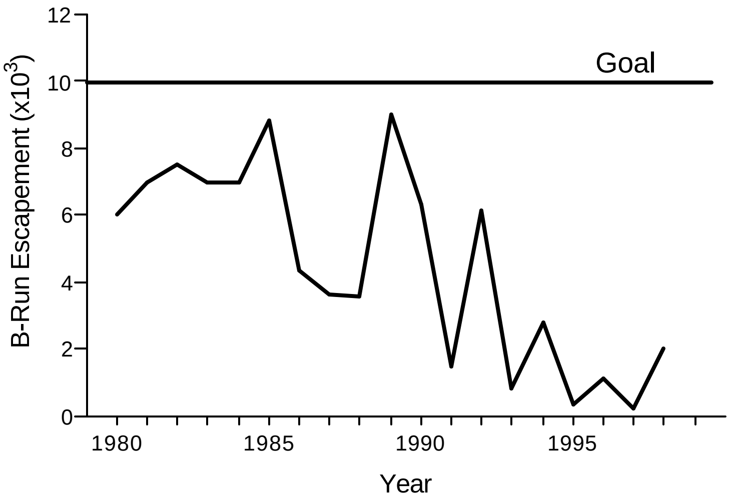
Source: Escapement through 1995 from TAC (1997); escapement for 1996–1998 from pers. comm. G. Mauser (IDFG).

Figure 2. Escapement of A-Run Snake River Steelhead to Lower Granite Dam.



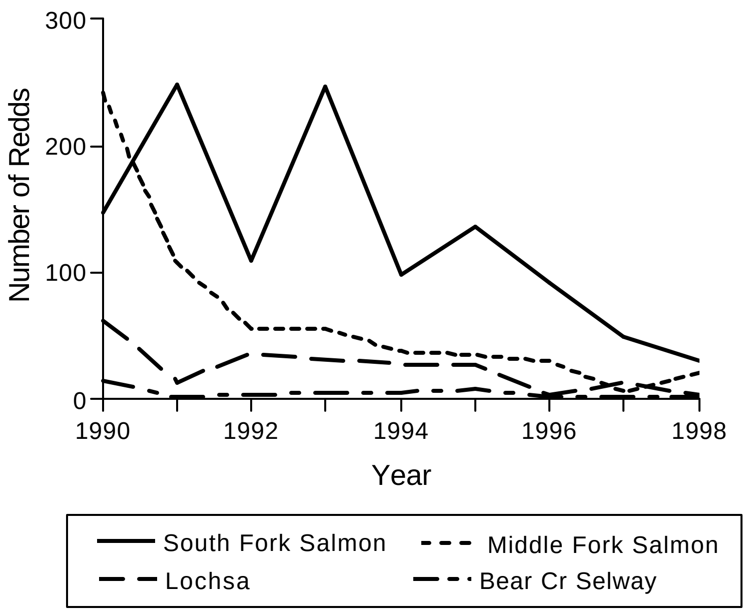
Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8
(TAC 1997) and pers. comm . G. Mauser, (IDFG).

Figure 3. Escapement of B-Run Snake River Steelhead to Lower Granite Dam.

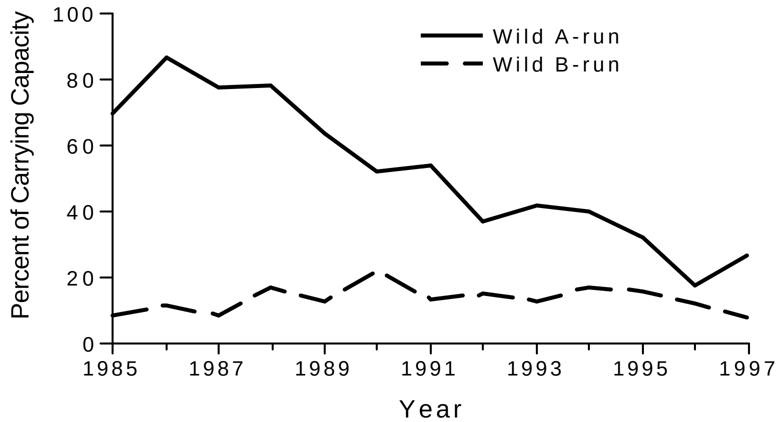


Source: Data for 1980 through 1984 from Figures 1 and 2 of Section 8 in TAC (1997). Data for 1985 through 1998 from Table 2 of Section 8
(TAC 1997) and pers. comm. G. Mauser (IDFG).

Figure 4. Redd Counts for Wild Snake River (B-Run) Steelhead in the South Fork and Middle Fork Salmon, Lochsa, and Bear Creek-Selway Index Areas.



Data for the
and Crooked
Sources:
(IDFG),
Counts",
IDFG



Lochsa exclude Fish Creek
Fork.
memo from T. Holubetz
"1997 Steelhead Redd
dated May 16, 1997, and
(unpublished).

Figure 5. Capacity 1+ and - Run Streams

Estimated Carrying for Juvenile (Age-2+) Wild-A and B-Steelhead in Idaho

Source: Data for 1985 through 1996 from (Hall-Griswold and Petrosky 1998); data for 1997 from IDFG (unpublished).

It is first relevant to put the Snake River basin into context. The Snake River historically supported over 55% of total natural-origin production of steelhead in the Columbia River Basin and now has approximately 63% of the basin's natural production potential (Mealy 1997). B-run steelhead occupy four major subbasins including two on the Clearwater River (Lochsa and Selway) and two on the Salmon River (Middle Fork and South Fork Salmon), areas that for the most part are not occupied by A-run steelhead. Some natural B-run steelhead are also produced in parts of the mainstem Clearwater and its major tributaries. There are alternative escapement objectives for B-run steelhead of 10,000

(TAC 1997) and 31,400 (Idaho). B-run steelhead, therefore, represent at least 1/3 and as much as 3/5 of the production capacity of the ESU.

As pointed out above, the geographic distribution of B-run steelhead is restricted to particular watersheds within the Snake River Basin (areas of the mainstem Clearwater, Selway, and Lochsa Rivers and the South and Middle Forks of the Salmon River). No recent genetic data are available for steelhead populations in South and Middle Forks of the Salmon River. The Dworshak National Fish Hatchery (NFH) stock and natural populations in the Selway and Lochsa Rivers are thus far the most genetically distinct populations of steelhead in the Snake River Basin (Waples et al. 1993). In addition, the Selway and Lochsa River populations from the Middle Fork Clearwater appear to be very similar to each other genetically, and naturally produced rainbow trout from the North Fork Clearwater River (above Dworshak Reservoir) clearly show an ancestral genetic similarity to Dworshak NFH steelhead. The existing genetic data, the restricted geographic distribution of B-run steelhead in the Snake (Columbia) River Basin, and the unique life history attributes of these fish (i.e. larger, older adults with a later distribution of

run timing compared to A-run steelhead in other portions of the Columbia River Basin) clearly support the conservation of B-run steelhead as a biologically significant component of the Snake River ESU.

Another approach to assessing the status of an ESU being developed by NOAA Fisheries is to consider the status of its component populations. For this purpose a population is defined as a group of fish of the same species spawning in a particular lake or stream (or portion thereof) at a particular season, which to a substantial degree do not interbreed with fish from any other group spawning in a different place or in a the same place at a different season. Because populations as defined here are relatively isolated, it is biologically meaningful to evaluate the risk of extinction of one population independently from any other. Some ESUs may be comprised of only one population whereas others will be constituted by many. The background and guidelines related to the assessment of the status of populations is described in a recent draft report discussing the concept of viable salmonid populations (McElhany et al. 2000).

The task of identifying populations within an ESU will require making judgements based on the available information. Information regarding the geography, ecology, and genetics of the ESU are relevant to this determination. Although NOAA Fisheries has not compiled and formally reviewed all the available information for this purpose, it is reasonable to conclude that, at a minimum, each of the major subbasins in the ESU represent a population within the context of this discussion. A-run populations would therefore include at least the tributaries to the lower Clearwater, the upper Salmon River and its tributaries, the lower Salmon River and its tributaries, the Grand Ronde, Imnaha, and possibly the Snake River mainstem tributaries below Hells Canyon Dam. B-run populations would be identified in the Middle Fork and South Fork Salmon Rivers and the Lochsa and Selway Rivers (major tributaries of the upper Clearwater), and possibly in the mainstem Clearwater River, as well. These basins are, for the most part, large geographical areas and it is quite possible that there is additional population structure within at least some of these basins. However, because that hypothesis has not been confirmed, NOAA Fisheries assumes that there are at least five populations of A-run steelhead and five populations of B-run steelhead in the Snake River basin ESU. Escapement objectives for A and B-run production areas in Idaho, based on estimates of smolt production capacity, are shown in Table 1.

1. Lower Snake River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lower Snake River is summarized from the Lower Snake River Subbasin Biological Assessment (BLM 2000a), except where noted.

Table 1. Adult Steelhead Escapement Objectives Based on Estimates of 70% Smolt Production Capacity

A-Run Production Areas		B-Run Production Areas	
Upper Salmon	13,570	Mid Fork Salmon	9,800
Lower Salmon	6,300	South Fork Salmon	5,100
Clearwater	2,100	Lochsa	5,000
Grand Ronde	(1)	Selway	7,500
Imnaha	(1)	Clearwater	4,000
Total	**21,970**	**Total**	**31,400**

Note: comparable estimates are not available for populations in Oregon and Washington subbasins.

Species Distribution: Within the Lower Snake River Subbasin steelhead trout use occurs in most of the accessible streams when stream conditions are suitable. Steelhead trout use the mainstem Snake River for upstream and downstream passage. A limited amount of juvenile rearing and overwintering by adults occurs in the Snake River. Most accessible tributaries are used by steelhead for spawning and rearing. The larger streams used for spawning and rearing include Asotin, Ten Mile, Couse, Captain John, Jim, and Cook Creeks. Other smaller tributary streams with limited rainbow/steelhead use include Tammany, Tenmile, Corral, Cache, Cottonwood, and Cherry Creeks.

Location of Important Spawning and Rearing Areas: Asotin Creek, followed by Captain John, Ten Mile, and Couse Creeks have the highest potential for steelhead production within the subbasin. Priority watersheds include Asotin and Captain John Creeks.

Conditions and Trends of Populations: Despite their relatively broad distribution, very few healthy steelhead populations exist (Quigley and Arbelbide 1997). Recent status evaluations suggest many steelhead stocks are depressed. A recent multi-agency review showed that total escapement of salmon and steelhead to the various Columbia River regions has been in decline since 1986 (Anderson et al. 1996). Existing steelhead stocks consist of four main types: wild, natural (non-indigenous progeny spawning naturally), hatchery, and mixes of natural and hatchery fish. Production of wild anadromous fish in the Columbia River Basin has declined about 95% from historical levels (Huntington et al. 1994). Most existing steelhead production is supported by hatchery and natural fish as a result of large-scale hatchery mitigation production
programs. Wild, indigenous fish, unaltered by hatchery stocks, are rare and present in only 10% of the historical range and 25% of the existing range. Remaining wild stocks are concentrated in

the Salmon and Selway (Clearwater Basin) rivers in central Idaho and the John Day River in Oregon. Although few wild stocks were classified as strong, the only subwatersheds classified as strong were those sustaining wild stocks.

<u>2. Clearwater River, North Fork Clearwater River, and Middle Fork Clearwater River Subbasins</u>

Information on steelhead distribution, important watersheds, and conditions and trends in the Clearwater River is summarized from the Clearwater River, North Fork Clearwater River and Middle Fork Clearwater River Subbasins Biological Assessment (BLM 2000b), except where noted.

Species Distribution: Within the Clearwater River Subbasin steelhead trout use is widespread and most accessible tributaries are used year-long or seasonally. In the Clearwater River drainage, the primary steelhead producing streams include: Potlatch River, Lapwai, Big Canyon, Little Canyon, Lolo, and Lawyer Creeks. Other Clearwater River mainstem tributary streams providing spawning and/or rearing habitat for steelhead trout include Lindsay, Hatwai, Lapwai, Catholic, Cottonwood, Pine, Bedrock, Jacks, Big Canyon, Orofino, Jim Ford, Big, Fivemile, Sixmile, and Tom Taha Creeks. Some of these streams provide sub-optimal spawning and rearing habitat because of steep stream gradients, barriers, low flows, limited spawning gravels, and small size of tributaries.

In the 1969 the U.S. Army Corps of Engineers finished construction of Dworshak Dam on the North Fork Clearwater River, which totally blocked access to anadromous fish. To mitigate for the steelhead losses resulting from the dam, Dworshak National Fish Hatchery (NFH) was constructed in 1969. Wild B-run steelhead are collected at the base of the dam and used as the brood stock for Dworshak NFH. Since 1992, steelhead eggs collected at Dworshak NFH have been shipped as eyed eggs to the Clearwater Fish Hatchery, located at the confluence of the North Fork Clearwater River and the Clearwater River, for incubation and rearing. Three satellite facilities are associated with the Clearwater Fish Hatchery: Crooked River, Red River, and Powell. The Kooskia NFH is located on Clear Creek, a tributary to the Middle Fork Clearwater River.

Location of Important Spawning and Rearing Areas: The only watershed identified as a special emphasis or priority watershed for steelhead trout in the Clearwater River Subbasin is Lolo Creek.

Conditions and Trends of Populations: Refer to "Conditions and Trends of Populations" under Lower Snake River Subbasin above.

3. South Fork Clearwater River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the South Fork Clearwater River is summarized from the Draft Clearwater Subbasin Assessment (CPAG 2002), except where noted.

Species Distribution: Within the South Fork Clearwater River Subbasin, steelhead trout use is widespread, and most accessible tributaries are used year-long or seasonally. In the South Fork drainage, the primary steelhead producing drainages include Newsome Creek, American River, Red River, and Crooked River. Other South Fork Clearwater River mainstem tributary streams providing spawning and/or rearing habitat for steelhead trout include Tenmile, Johns, Meadow, and Mill Creeks (Jody Brostrom, Idaho Department of Fish and Game, pers. comm.
March 30, 2001). Low order streams and accessible headwater portions of high order streams provide early rearing habitat (Nez Perce National Forest 1998).

Location of Important Spawning and Rearing Areas: Important spawning habitat in the South Fork Clearwater occurs primarily in Newsome Creek, American River, Red River, and Crooked River.

Conditions and Trends of Populations: The South Fork Clearwater River may have historically maintained a genetically unique stock of steelhead trout, but hatchery supplementation has since clouded the lines of genetic distinction between stocks (Nez Perce National Forest 1998). Robin Waples (In a letter to S. Kiefer, Idaho Department of Fish and Game, August 25, 1998) found that steelhead trout in Johns and Tenmile Creeks are genetically most similar to fish originating from the Selway River system, suggesting that some genetic difference may have existed historically within the South Fork Clearwater drainage. A statewide genetic analysis is currently being conducted using DNA markers, and may provide more information on past and current genetic distinctions between steelhead trout stocks in the Clearwater subbasin (Byrne 2001).

4. Selway River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Selway River is summarized from the Lower Selway Biological Assessment (USFS 1999a), the Biological Opinion on Culvert Replacements on Lolo Creek and Lochsa River (NMFS 2002a), and the Biological Opinion on Recreational Suction Dredge Mining in Lolo Creek (NOAA Fisheries 2003), except where noted.

Species Distribution: High numbers of juvenile steelhead trout have been documented in all of the fifth code watersheds above the Selway-Bitterroot wilderness boundary. In addition, Meadow and Gedney Creeks also support high numbers of both steelhead and resident rainbow trout. Densities of steelhead are less in O'hara, Swiftwater, Goddard, and Falls Creeks (USFS unpublished data 1990 - 1998). Densities in Nineteenmile, Rackliffe, Boyd, and Glover Creeks are limited by small size and accessibility although the species is present. Spawning habitat for steelhead has been documented in most of the surveyed tributaries, including small third order streams such as Renshaw and Pinchot Creeks. In the Selway River, stream survey data and casual observations suggest that the steelhead/rainbow population in the larger tributaries, i.e. Meadow and Moose Creeks, are composed of a significant resident rainbow/redband component (USFS unpublished data 1996, 1997). Survey data and observations revealed the presence of large number of rainbow trout greater than 220 mm, especially in North Moose Creek. In addition, observations suggest the presence of two distinct forms of this species. Steelhead and rainbow of all sizes differed phenotypically; there appeared to be a distinct "steelhead" presmolt form, which was more bullet-shaped and silvery in color, and a distinct "trout" form, which was less bullet-shaped, retained parr marks at larger sizes, and exhibited coloration and spotting more typical of other inland rainbow populations. It is possible that resident rainbow trout and steelhead trout are reproductively isolated, which may have resulted in genetic divergence. Analysis of the genetic composition of the Moose Creek population may be attempted in future years.

Location of Important Spawning and Rearing Areas: The most important spawning and rearing areas for steelhead are located in the larger tributaries, such as Meadow, Moose, Gedney, Three

Links, Marten, Bear, Whitecap, Running, Ditch, Deep, and Wilkerson Creeks. Moose Creek may support the most significant spawning and rearing habitat for steelhead trout of any of these tributaries.

Conditions and Trends of Populations: The Selway River drainage (along with the Lochsa and lower Clearwater River tributary systems) is one of the only drainages in the Clearwater Subbasin where steelhead populations have little or no hatchery influence (Busby et al. 1996; IDFG 2001). The USFS (1999a) identified the Lochsa and Selway River systems as refugia areas for steelhead based on location, accessibility, habitat quality, and number of roadless tributaries. The Idaho Department of Fish and Game (IDFG) estimates that approximately 80% of the wild steelhead in the Clearwater River Subbasin are destined for the Lochsa River and Selway River drainages. The Clearwater River Basin produces the majority of B-run steelhead in the Snake River ESU, and most of the Clearwater steelhead are produced in the Lochsa River Subbasin. The Lochsa River Subbasin has the highest observed densities of age 1+ B-run steelhead parr, and the highest percent carrying capacity (IDFG 1999). Hatchery steelhead were used to supplement natural populations in the Lochsa River drainage before 1982, but current management does not include any hatchery supplementation. Current adult returns are considered to be almost entirely wild steelhead trout progeny.

5. Lochsa River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lochsa River is summarized from the Biological Opinion on Culvert Replacements on Lolo Creek and Lochsa River (NMFS 2002a) and the Biological Opinion on Recreational Suction Dredge Mining in Lolo Creek (NOAA Fisheries 2003), except where noted.

Species Distribution: Adult Snake River steelhead are present in the upper mainstem Clearwater River in September and October, and in the upper mainstem and Middle Fork Clearwater Rivers in the winter. Spawning and incubation occurs in streams such as the Lochsa River from March through July. Steelhead juveniles then typically rear for 2 to 3 years in the tributaries and larger rivers before beginning a seaward migration during February through May.

Location of Important Spawning and Rearing Areas: Steelhead have been observed in most of the larger tributaries to the Lochsa River, with high steelhead productivity occurring in Fish, Boulder, Deadman, Pete King, and Hungery Creeks (USFS 1999b).

Conditions and Trends of Populations: Refer to "Conditions and Trend of Populations" under Selway River Subbasin above.

6. Lower Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Lower Salmon River is summarized from the Lower Salmon River Subbasin Biological Assessment (BLM 2000c).

Species Distribution: Within the Lower Salmon River Subbasin, steelhead trout use occurs in most of the accessible streams when stream conditions are suitable. Steelhead trout use the mainstem Salmon River for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering may occur in the Salmon River. Most accessible tributaries are used by steelhead for spawning and rearing. The larger streams used for spawning and rearing include China, Eagle, Deer, Cottonwood, Maloney, Deep, Rice, Rock, White Bird, Skookumchuck, Slate, John Day, Race, Lake, Allison, Partridge, Elkhorn, and French Creeks. Other smaller tributary streams with limited rainbow/steelhead use include Flynn, Wapshilla, Billy, Burnt, Round Springs, Telcher, Deer, McKinzie, Christie, Sherwin, China, Cow, Fiddle, Warm Springs, Van, and Robbins Creeks.

Location of Important Spawning and Rearing Areas: Slate Creek, followed by White Bird Creek, has the highest potential for steelhead production within the subbasin. Priority watersheds identified for steelhead trout include China, Eagle, Deer, White Bird, Skookumchuck, Slate, John

Day, Race, Allison, Partridge, and French Creeks. Other streams which are important for spawning and rearing include Cottonwood, Maloney, Deep, Rice, Rock, Lake, and Elkhorn Creeks.

Conditions and Trends of Populations: The Bureau of Land Management (BLM) noted that current numbers of naturally spawning steelhead trout in the Salmon River Subbasin are at all time lows, and overall trend is downward. Adult steelhead trout were commonly observed in most larger tributaries during the 1970s through 1980s, but now such observations have significantly declined (BLM 2000c).

The Nez Perce National Forest conducted an ecosystem analysis at the watershed scale for Slate Creek (USFS 2000) and concluded that the distribution of fish species assessed is relatively consistent with historic distribution. Steelhead trout populations are thought to have experienced a great decline from historic levels although the data to describe the extent of this reduction is not available (USFS 2000). The BLM has conducted trend monitoring of fish populations in lower Partridge Creek and French Creek. Partridge Creek densities of age 0 rainbow/steelhead trout in 1988 were 0.30 fish/m2 and age 1 rainbow/steelhead trout densities were 0.19 fish/m2. In 1997, age 0 densities were 0.003

fish/m2 and age 1 densities were 0.01 fish/m2. French Creek densities of age 0 rainbow/steelhead trout in 1991 were 0.07 fish/m2 and age 1 rainbow/steelhead trout densities were 0.07 fish/m2. In 1997, age 0 densities were 0.0075 fish/m2 and age 1 densities were 0.02 fish/m2. Densities of steelhead trout have significantly declined from the 1980s through the late 1990s.

7. Little Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Little Salmon River is summarized from the Little Salmon River Subbasin Biological Assessment (BLM 2000d), except where noted.

Species Distribution: Within the Little Salmon River Subbasin, steelhead trout use occurs in the lower portion of the subbasin and tributaries, downstream from barriers located at river mile (RM) 21 in the Little Salmon River. No recent or historic documentation exists for steelhead trout using streams above RM 24 in the Little Salmon River. Welsh et al. (1965) reports that no known passage by salmon or steelhead exists above the Little Salmon River falls. Ineffectual fish passage facilities were constructed at the falls by the Civilian Conservation Corps during the 1930s (Welsh et al. 1965). Streams and rivers providing important spawning and rearing for steelhead trout include Little Salmon and River Rapid Rivers, and Boulder, Hazard, and Hard Creeks. Other Little Salmon River mainstem tributary streams providing spawning and rearing habitat include Squaw, Sheep, Hat, Denny, Lockwood, Rattlesnake, Elk, and Trail Creeks. Adult steelhead trout have been documented in these streams. Primary steelhead use of these streams is often associated with the mouth area or a small stream segment or lower reach, before steep gradients/cascades or a barrier restricts upstream fish passage. These streams generally provide sub-optimal spawning and rearing habitat because of steep stream gradients, barriers, low flows, limited spawning gravels, and small size of tributaries.

Location of Important Spawning and Rearing Areas: Priority watersheds for steelhead trout include Rapid River, Boulder, Hazard, and Hard Creeks. These streams provide important spawning and rearing habitat for steelhead trout. Rapid River is a stronghold and key refugia area for steelhead trout.

Conditions and Trends of Populations: The BLM noted that current numbers of naturally spawning steelhead trout in the Little Salmon River Subbasin are at all-time lows, and overall trend is downward. The highest number of adult natural spawning steelhead trout counted at the Rapid River weir was 162 in 1993, and the lowest counted was 10 in 1999 (BLM 2000d).

8. Middle Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Middle Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000e), except where noted.

Species Distribution: Within the Middle Salmon River Subbasin, steelhead trout use the mainstem Salmon River for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering may occur in the Middle Salmon River. Most accessible tributaries are used by steelhead for spawning and rearing. Key steelhead spawning and rearing is probably occurring in Crooked, Bargamin and Sabe Creeks and the lower Wind River on the north side of the Salmon River and California, Warren, Chamberlain, and Horse Creeks on the south side of the Salmon River.

Location of Important Spawning and Rearing Areas: Priority watersheds for steelhead include Warren and California Creeks. Steelhead use Warren Creek for spawning and rearing habitat. No fish passage barriers exist for steelhead within the drainage. Steelhead were found in Richardson, Stratton, Steamboat, and Slaughter Creeks (Raleigh 1995). Most other tributaries were surveyed, but no steelhead were found. Because of habitat alterations from past mining (e.g., in-channel dredging, piling of dredged material adjacent to streams) and limited suitable habitat, steelhead use of the upper portion of the Warren Creek subwatershed is limited. Carey and Bear Creeks provide habitat in the lower reaches.

Conditions and Trend of Populations: Refer to “Conditions and Trends of Populations” under Lower Salmon River Subbasin above.

9. South Fork Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the South Fork Salmon River is summarized from the Middle Salmon River and South Fork Salmon River Subbasins Biological Assessment (BLM 2000e), except where noted.

Species Distribution: Steelhead have been documented in the South Fork Salmon River and lower portions of its major tributaries. Most of the mainstem spawning occurs between the East Fork Salmon River and Cabin Creek. Principle spawning areas are located near Stolle Meadows, from Knox Bridge to Penny Spring, Poverty Flat, Darling cabins, the Oxbow, and from 22 Hole to Glory Hole (USFS 1998).

Location of Important Spawning and Rearing Areas: Primary spawning tributaries in the South Fork Salmon River Subbasin are Burntlog, Lick, Lake, and Johnson Creeks, the East Fork South Fork Salmon and Secesh Rivers (USFS 1998).

Conditions and Trends of Populations: Refer to “Conditions and Trends of Populations” under Lower Salmon River Subbasin above.

10. Upper Salmon River Subbasin

Information on steelhead distribution, important watersheds, and conditions and trends in the Upper Salmon River is summarized from the Biological Opinion on Effects of 2002 Herbicide Treatment of Noxious Weeds on Lands Administered by the Salmon-Challis National Forest (NMFS 2002b).

Species Distribution: Steelhead trout in the Upper Salmon River subbasin occur in most of the accessible streams when stream conditions are suitable. Steelhead use the mainstem for upstream and downstream passage. A limited amount of juvenile rearing and adult overwintering occurs in the Upper Salmon River. Most accessible tributaries are used for spawning and rearing.

Location of Important Spawning and Rearing Areas: Key steelhead spawning and rearing probably occurs in Morgan, Thompson and Panther Creeks, in addition to the Yankee Fork Salmon, Pahsimeroi, North Fork Salmon, East Fork Salmon, and Lemhi Rivers.

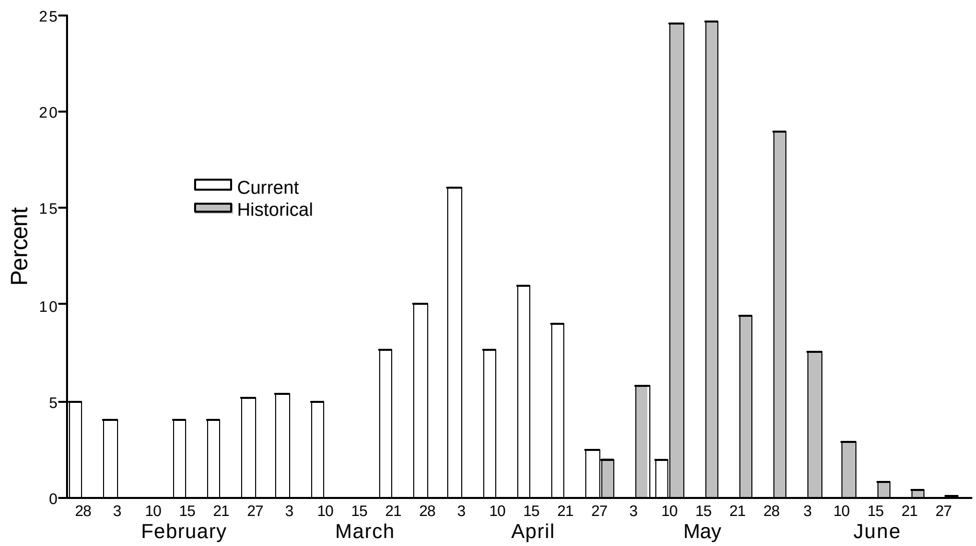
Conditions and Trends of Populations: Refer to “Conditions and Trends of Populations” under Lower Salmon River Subbasin above.

C. Hatchery Populations

Hatchery populations, if genetically similar to their natural-origin counterparts, provide a hedge against extinction of the ESU or of the gene pool. The Imnaha and Oxbow hatcheries produce A-run stocks that are currently included in the Snake River basin steelhead ESU. The Pahsimeroi and Wallowa hatchery stocks may also be appropriate and available for use in developing supplementation programs; NOAA Fisheries required in its recent biological opinion on Columbia basin hatchery operations that this program begin to transition to a local-origin broodstock to provide a source for future supplementation efforts in the lower Salmon River (NMFS 1999). Although other stocks provide more immediate opportunities to initiate supplementation programs within some subbasins, it may also be necessary and desirable to develop additional broodstocks that can be used for supplementation in other natural production areas. Despite uncertainties related to the likelihood that supplementation programs can accelerate the recovery of naturally spawning populations, these hatchery stocks provide a safeguard against the further decline of natural-origin populations.

The Dworshak NFH is unique in the Snake River Basin in producing a B-run hatchery stock.   The Dworshak stock was developed from natural-origin steelhead from the North Fork Clearwater River, is largely free of other hatchery introductions, and was therefore included in the ESU, although not as part of the listed population. However, past hatchery practices and possibly changes in flow and temperature conditions related to Dworshak Dam have lead to substantial divergence in spawn timing of the hatchery stock compared to historical timing in the North Fork Clearwater River, and compared to natural-origin populations in other parts of the Clearwater Basin. Because the spawn timing of the hatchery stock is much earlier than historically (Figure 6), the success of supplementation efforts using these stocks may be limited. In fact, past supplementation efforts in the South Fork Clearwater River using Dworshak NFH stock have been largely unsuccessful, although improvements in out-planting practices have the potential to yield different results.

Figure 6. Historical Versus Current Spawn-Timing of Steelhead at Dworshak Hatchery.



In addition, the unique genetic character of Dworshak NFH steelhead will limit the degree to which the stock can be used for supplementation in other parts of the Clearwater Subbasin, and particularly in the Salmon River B-run basins. Supplementation efforts in those areas, if undertaken, will more likely have to rely on the future development of local broodstocks. Supplementation opportunities in many of the B-run production areas may be limited because of logistical difficulties associated with high mountain, wilderness areas. Because opportunities to accelerate the recovery of B-run steelhead through supplementation, even if successful, are expected to be limited, it is essential to maximize the escapement of natural-origin steelhead in the near term.

D. Conclusion

Finally, the conclusion and recommendations of the TAC's All Species Review (TAC 1997) are pertinent to this status review of Snake River steelhead. Considering information available through 1996, the 1997 All Species Review stated:

> "Regardless of assessment methods for A and B steelhead, it is apparent that the primary goal of enhancing the upriver summer steelhead run is not being achieved. The status of upriver summer steelhead, particularly natural-origin fish, has become a serious concern. Recent declines in all stocks, across all measures of abundance, are disturbing."

> "There has been no progress toward rebuilding upriver runs since 1987. Throughout the Columbia River basin, dam counts, weir counts, spawning surveys, and rearing densities indicate natural-origin steelhead abundance is declining, culminating in the proposed listing of upriver stocks in 1996. Escapements have reached critically low levels despite the relatively high productivity of natural and hatchery rearing environments. Improved flows and ocean conditions should increase smolt-adult survival rates for upriver summer steelhead. However, reduced returns in recent years are likely to produce fewer progeny and lead to continued low abundance."
>
> "Although steelhead escapements would have increased (some years substantially) in the absence of mainstem fisheries, data analyzed by the TAC indicate that effects other than mainstem Columbia River fishery harvest are primarily responsible for the currently depressed status and the long term health and productivity of wild steelhead populations in the Columbia River."
>
> "Though harvest is not the primary cause of declining summer steelhead stocks, and harvest rates have been below guidelines, harvest has further reduced escapements. Prior to 1990, the aggregate of upriver summer steelhead in the mainstem Columbia River appears at times to have led to the failure to achieve escapement goals at Lower Granite Dam. Wild Group B steelhead are presently more sensitive to harvest than other salmon stocks, including the rest of the steelhead run, due to their depressed status and because they are caught at higher rates in the Zone 6 fishery."

Small or isolated populations are much more susceptible to stochastic events such as drought and poor ocean conditions. Harvest can further increase the susceptibility of such populations. The Columbia River Fish Management Plan (TAC 1997) recognizes that harvest management must be responsive to run size and escapement needs to protect these populations. The parties should ensure that TAC 1997 harvest guidelines are sufficiently protective of weak stocks and hatchery broodstock requirements.

For the Snake River steelhead ESU as a whole, the median population growth rate (lambda) from years 1980-1997, ranges from 0.699 to 0.978, depending on the assumed number of hatchery fish reproducing in the river (Table 2). NOAA Fisheries estimated the risk of absolute extinction for A- and B-runs, based on assumptions of complete hatchery spawning success, and no hatchery spawning success. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of absolute extinction within 100 years is 0.01 for A-run steelhead and 0.93 for B-run fish. At the high end, assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of absolute extinction within 100 years is 1.00 for both runs.

Table 2. Annual rate of population change (λ) in Snake River steehead, absolute risk of extinction (1 fish/generation), and risk of 90% decline in 24 and 100 years for the period 1980-1997†. The range of reported values assumes that hatchery-origin fish either do not contribute to natural production or are as

Model Assumptions	l	**Risk of Extinction**		**Probability of 90% decrease in stock abundance**	
		24 years	100 years	24 years	100 years
No Correction for Hatchery Fish	0.978	A-Run 0.000 B-Run 0.000	A-Run 0.000 B-Run 0.000	A-Run 0.000 B-Run 0.060 Aggregate 0.000	A-Run 0.000 B-Run 0.520 Aggregate 0.434
No Instream Hatchery Reproduction	0.910	A-Run 0.000 B-Run 0.000	A-Run 0.010 B-Run 0.093	A-Run 0.200 B-Run 0.730 Aggregate 0.476	A-Run 1.000 B-Run 1.000 Aggregate 1.000
Instream Hatchery Reproduction = Natural Reproduction	0.699	A-Run 0.000 B-Run 0.000	A-Run 1.000 B-Run 1.000	A-Run 1.000 B-Run 1.000 Aggregate 1.000	A-Run 1.000 B-Run 1.000 Aggregate 1.000

† From Table B-2a and B-2b. Cumulative Risk Initiative. September 5, 2000, revised appendix B (McClure et al. 2000).

productive as natural-origin spawners.

E. References

Anderson, D.A., G. Christofferson, R. Beamesderfer, and others. 1996. Streamnet: the north-west aquatic resource information network. Report on the status of salmon and steelhead in the Columbia River basin, 1995. Unpublished report, Project number 88-108-04, Contract Number 95B165130, Northwest Power Planning Council and U.S. Department of Energy, Bonneville Power Administration, Portland, Oregon.

Barnhart, R. A. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest)–steelhead. U.S. Fish and Wildlife Service, Biological Report 82 (11.60).

Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6, Bethesda, Maryland.

Bureau of Land Management (BLM). 2000a. Lower Snake River Subbasin: Biological Assessment of Ongoing and Proposed Bureau of Land Management Activities on Sockeye Salmon, Fall Chinook Salmon, Spring/Summer Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho.

BLM. 2000b. Clearwater River, North Fork Clearwater River, and Middle Fork Clearwater River Subbasins: Biological Assessment of Ongoing and Proposed Bureau of Land Management Activities on Sockeye Salmon, Fall Chinook Salmon, Spring/Summer Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho.

BLM. 2000c. Lower Salmon River Subbasin: Biological Assessment of Ongoing and Proposed Bureau of Land Management Activities on Sockeye Salmon, Fall Chinook Salmon, Spring/Summer Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho.

BLM. 2000d. Little Salmon River Subbasin: Biological Assessment of Ongoing and Proposed Bureau of Land Management Activities on Sockeye Salmon, Fall Chinook Salmon, Spring/Summer Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho.

BLM. 2000e. Middle Salmon River and South Fork Salmon River Subbasins: Biological Assessment of Ongoing and Proposed Bureau of Land Management Activities on Sockeye Salmon, Fall

Chinook Salmon, Spring/Summer Chinook Salmon, Steelhead Trout, Bull Trout, and BLM Sensitive Species. Cottonwood, Idaho.

Burgner, R. L., J. T. Light, L. Margolis, T. Okazaki, A. Tautz, and S. Ito. 1992. Distribution and origins of steelhead trout (Oncorhynchus mykiss) in offshore waters of the North Pacific Ocean. International North Pacific Fish Commission Bulletin 51.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. NOAA Technical Memorandum NMFS-NWFSC-27. August.

Byrne, A. 2001. Steelhead Supplementation Studies in Idaho Rivers. 2000 Annual Report. Idaho Department of Fish and Game Report 01-15. Bonneville Power Administration Project Number: 199005500.

Clearwater Policy Advisory Group(CPAG). 2002. Draft Clearwater Subasin Assessment, September 2002. Submitted for review to the Northwest Power Planning Council, Portland, Oregon.

Everest, F. H. 1973. Ecology and management of summer steelhead in the Rogue River. Oregon State Game Commission, Fisheries Research Report 7, Corvallis, Oregon.

Giger, R. D. 1973. Streamflow requirements of salmonids. Oregon Wildlife Commission, Final Report (Project AFS-62-1), Portland, Oregon.

Hall-Griswold, J. A., and C. E. Petrosky. 1998. Idaho habitat/natural production monitoring. Part 1: general monitoring subproject. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, Annual Report 1996 (Project 91-73), Portland, Oregon.

Hartt, A. C., and M. B. Dell. 1986. Early oceanic migrations and growth of juvenile Pacific salmon and steelhead trout. International North Pacific Fisheries Commission Bulletin 46:1-105.

Huntington, C.W., W. Nehlsen, and J. Bowers. 1994. Healthy native stocks of anadromous salmonids in the Pacific Northwest and California. Portland, Oregon: Oregon Trout.

Idaho Department of Fish and Game(IDFG). 1999. Parr Monitoring Database: 1985-1987 Snorkel Survey Fish Counts for the Clearwater Basin. Idaho Fish and Game, Boise, Idaho

IDFG. 2001. IDFG Fisheries Management Plan 2001-2006. Idaho Fish and Game, Boise, Idaho.

Marmorek, D. R., and C. N. Peters, editors. 1998. Plan for analyzing and testing hypotheses (PATH): preliminary decision analysis report on Snake River spring/summer chinook. ESSA Technologies Ltd., Vancouver, British Columbia.

McClure, B. Sanderson, E. Holmes, C. Jordan, P. Kareiva, and P. Levin. 2000. Revised Appendix B of standardized quantitative analysis of the risks faced by salmonids in the Columbia River basin. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, Washington. September.

McElhany, P., M. Ruckelshaus, M. J. Ford, T. Wainwright, and E. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. National Marine Fisheries Service, Northwest Fisheries Science Center, Draft Report, Seattle, Washington. January 6.

Mealy, S. P. 1997. Letter re: State of Idaho’s comments on the proposed listing of Snake River steelhead for protection under the Federal Endangered Species Act. Idaho Department of Fish and Game. February 11.

Meehan, W. R., and T. C. Bjornn. 1991. Salmonid distributions and life histories. Pages 47-82 *in* W. R. Meehan, editor. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland.

National Marine Fisheries Service (NMFS). 1999. Biological Opinion on Artificial Propagation in the Columbia River Basin—incidental take of listed salmon and steelhead from Federal and non-Federal hatchery programs that collect, rear, and release unlisted fish species. Endangered Species Act Section 7 Consultation. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, Washington.

NMFS. 2002a. Biological Opinion on Culvert Replacements on Lolo Creek and Lochsa River Idaho and Clearwater Counties, Idaho. Endangered Species Act Section 7 Consultation. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, Washington.

NMFS. 2002b. Biological Opinion on Effects of 2002 Herbicide Treatment of Noxious Weeds on Lands Administered by the Salmon-Challis National Forest. Endangered Species Act Section 7 Consultation. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, Washington.

Nez Perce National Forest. 1998. South Fork Clearwater River Landscape Assessment. Volume I: Narrative.

Nickelson, T. E., J. W. Nicholas, A. M. McGie, R. B. Lindsay, D. L. Bottom, R. J. Kaiser, and S. E. Jacobs. 1992. Status of anadromous salmonids in Oregon coastal basins. Oregon Department of Fish and Wildlife, Research and Development Section, Corvallis, and Ocean Salmon Management, Newport, Oregon.

NOAA's National Marine Fisheries Service (NOAA Fisheries). 2003. - Biological Opinion on Recreational Suction Dredge Mining in Lolo Creek. Endangered Species Act Section 7 Consultation. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, Washington.

Quigley, T.M., and S.J. Arbelbide, technical editors. 1997. An assessment of ecosystem components in the interior Columbia Basin. USDA Forest Service. Pacific Northwest Research Station. General Technical Report PNW-GTR-405.

Raleigh, R. 1995. Warren Creek drainage stream inventory report. Payette National Forest, McCall Ranger District. 1993-1995, Contract #: 53-0256-3-21, Volume 1: Warren Creek and Lower Altitude Tributaries. McCall Ranger District, McCall, Idaho.

Technical Advisory Committee(TAC). 1997. All species review, 1996—summer steelhead: Columbia River fish management plan. TAC for U.S. v. Oregon. August 4 (Tables 8-11, updated).

TAC. 1999. Minutes of meeting May 4-5, 1999. TAC for U.S. v. Oregon.

U.S. Forest Service (USFS). 1998. Biological assessment for the potential effects of managing the Payette Nation Forest in the South Fork Salmon River section 7 watershed on Snake River spring/summer and fall chinook salmon and Snake River steelhead, Volume 19: ongoing projects. Payette National Forest, McCall, Idaho.

USFS. 1999a. Biological Assessment: Lower Selway 4th Code HUC. Fish, Wildlife and Plants. Nez Perce National Forest, Moose Creek Ranger District.

USFS. 1999b. Clearwater National Forest monitoring & evaluation report, fiscal year 1998. Clearwater National Forest, Orofino, Idaho.

USFS. 2000. Slate Creek Ecosystem Analysis at the Watershed Scale, Volumes 1 and 2. Nez Perce National Forest, Grangeville, Idaho.

Waples, R. S., O. W. Johnson, P. B. Aebersold, C. K. Shiflett, D. M. VanDoornik, D. J. Teel, and A. E. Cook. 1993. A genetic monitoring and evaluation program for supplemented populations of salmon and steelhead in the Snake River Basin. Report to the U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, contract DE-A179-89BP00911.

Welsh, T.L., S. V. Gebhards, H.E. Metsker, and R.V. Corning. 1965. Inventory of Idaho streams containing anadromous fish, including recommendations for improving production of salmon and steelhead - Part I Snake, Salmon, Weiser, Payette, and Boise River drainages. Idaho State Fish and Game Department.

Withler, I. L. 1966. Variability in life history characteristics of steelhead trout (Salmo gairdneri) along the Pacific coast of North America. Journal of the Fisheries Research Board of Canada 23:365-393.